METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

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Volume 9, 1958

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ent Literature on Extended and Long Range Forecasting, p. 875

July 1958 No. 7

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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MALCOLM RIGBY, Editor

Vol. 9 JULY 1958 No. 7

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AGRICULTURE · COMMERCE · AERIAL AND MARINE NAVIGATION · PUBLIC HEALTH · INDUSTRY · ENGINEERING
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1919

SPECIAL FEATURE IN THIS ISSUE

Recent Literature on Extended and Long Range Forecasting

By
Geza Thuronyi

(*For complete table of contents see back cover*)

Published monthly at Prince and Lemon Streets, Lancaster, Pa., by the AMERICAN METEOROLOGICAL SOCIETY, 3 Joy Street, Boston 8, Mass.

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FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to ing to the attention of meteorologists current literature in their field and in related fields and provide bibliographic information on various subjects, as interest demands.

Part I contains abstracts of current literature in the fields of meteorology, oceanography, c., arranged according to the Universal Decimal Classification.

Part II of each issue comprises an annotated bibliography of important references on a ecial subject (usually arranged chronologically). No attempt is made to prepare exhaustive oliographies; instead, the aim is to include a representative cross section of the various pects of a subject.

Bibliographies published in the successive issues were:

Vol. I, 1950

Atmos. Pollution	2. Aerobiology	3. Cloud Physics	4. Hail
Tornadoes	6. Volcanic Dust	7. Climat. Changes	8. Thunderstorms
Icing	10. Acoust. Propagation	11. Evaporation	

Vol. II, 1951

Extended Forecast.	2. Long Range Forecast.	3. Soil Temp.	4. Constants, etc.
Clim. of Near East	6. Clim. of Middle East	7. Special Winds	8. Radar Storm De-
Condensation Trails	10. Clim. of N.E. Africa	11. Mountain Met.	tect.

Vol. III, 1952

Clim. of N.W. Africa	2. Carbon Dioxide	3. Clim. of Argentina, etc.	4. Dew
Objective Forecast.	6. Stratus Forecast.	7. Urban Climatology	8. Clim. of C. Africa
Visibility	10. Glaze and Rime	11. Free Air Turbulence	

Vol. IV, 1953

Turbulence Theory	2. Turbulent Diffusion	3. Frost	4. Clim. of Australia, etc.
High Level Winds	6. Winds in Stratosphere	7. Jet Stream	8. Radiation Bioclim.
Clim. of Pacific	10. Auroras	11. Sferics	

Vol. V, 1954

Oceanog. Met.	2. Clim. of S.E. Asia	3. Auroral Physics	4. Tropopause
Balloons	6. Numerical Forecast.	7. Radiation Data	8. Vertical Motion
Clim. of Arctic	10. Industrial Met.	11. Wind Waves and Swell	

Vol. VI, 1955

Bibliog. of Bibliog.	2. Texts & Monogr. Bibliogs.	3. Storm Surges	
Ionospheric Prop.	5. Photochem.—Upper Atmos.	6. Cloud Physics	
Radar Cloud Physics	8–9. Atmos. Nuclei	10. Weather Modification	11. Cooling Power

Vol. VII, 1956

Synoptic Met.-Arctic	2. Clim. of Enclosed Spaces	3. Cosmic Rays (–1952)
Cosmic Rays (1953–56)	5. Atmos. Radioactivity	6. Inversions
Snow Micromet.	8. Snow Micromet. (Suppl.)	9–11. Tropical Cyclones

Vol. VIII, 1957

Solar Weather Relations	2. Night Airglow	3. Forecasting Special Elements
Forest Micrometeorology	5. Hydromet. Forecasting	6. Numerical Forecasting (Suppl.)
Albedo 8. Meteors	9–10. Tropospheric Propagation	11. Medical Meteorology

Vol. IX, 1958

Radioastronomy	2. Solar Astrophysics	3. Radioactivity in Atmosphere
Waves and Currents	5. Physical Oceanog.	6. Dynamic & Phys. Oceanog.
Long Range Forcasting		

Other bibliographies in preparation are:

Actinometers	*Mesometeorology*	*Radar Meteorology*
Geomagnetism	*Micrometeorology*	*Singularities*
High Atmosphere Temperatures	*Ozone*	*Synoptic Aerology*

Part III contains a listing of reviews, translations, reprints, and the contents of important blications. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. The December issue nprises cumulative author, subject, geographical and journal indexes.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where t material may be found. The Union List of Serials (Gregory) is the source of most of t symbols used. In some cases, where no symbol has been assigned to a library, one will devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DNLM:	U. S. National Library of Medicine, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory Library, Milton, Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by char

Geographic locations are in the English form rather than the form used locally, for examp Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherw stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to t Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Numb (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus entry will read as follows:

Meteorologische Rundschau, 2(5/6):146–151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau, Jahrgang* 2 (V 2), *Heft* 5/6 (No. 5/6), *pages* 146–151, May/June 1950.

PART I: ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

MAJOR GENERAL WORKS

COLLECTED WORKS

9.7–1 5:06

†Alaskan Science Conference, 3rd, Mt. McKinley National Park, Sept. 22–27, 1952, **oceedings: Science in Alaska.** College, Alaska, Sept. **1954.** figs., tables, refs., bibliogs. any papers (pub. elsewhere in the interim) given in abstract only. On cover-page: Alaska vision, American Association for the Advancement of Science. **DWB** (506 A323s 1952) Papers (applying to Alaska) in all fields of science were read at this conference. About half the papers are in abstract form, the originals being published elsewhere with proper refer-ce citations in many instances. At least a dozen have to do with meteorology, aurora or nospheric physics research conducted in Alaska. For listing of papers of interest in Meteor-ogy and Geophysics, *see* Pt. III, p. 1560, Nov. 1957, *MAB.* These papers abstracted sep-ately. *Subject Heading:* **1. Alaskan Science Conference, 3rd, 1952.**—*M.R.*

9.7–2 625:631.4 551.573

*†Thornthwaite, Charles W.; Krimgold, D. B.; Mather, John R. et al., **Estimating soil ctionability from climatic data.** Johns Hopkins Univ. Laboratory of Climatology, Contract 19(604)-193, Final Report; *Publications in Climatology,* 7(3), **1954.** 447 p. tables, merous refs. **DWB**—Twelve articles deal with THORNTHWAITE's soil moisture bookkeeping ocedure, a critical discussion of his evapotranspiration formula, dependence of infiltration es on rainfall intensity, preparation of hydroclimatic maps, general principles of evaluating l tractionability, irrigation and hydropedological constants. (For contents, *see* Pt. III, 892, June 1955, *MAB.*) *Subject Headings:* **1. Soil trafficability 2. Thornthwaite's method Evapotranspiration. I. Johns Hopkins Univ. Laboratory of Climatology II. Contract 19(604)-193.**—*A.A.*

9.7–3 533.6(08) 533.607:551.551 533.607:551.571

North Atlantic Treaty Organization. Advisory Group for Aeronautical Research and velopment, **Papers presented during the Traveling Seminar of the Advisory Group, June -July 16, 1954.** Paris, [1955]. 78 p. figs. (incl. photos), refs., eqs.—Contains 8 papers aerodynamic turbulence studies, wind tunnel supersonic aerodynamics, flutter, etc., with ustrations showing flow regimes in pipes and tunnels, equipment, nomograms, etc. Paper J. SMOLDERN (p. 49) is on hygrometry and desiccation in supersonic wind tunnels, and by D. SCHETZER (p. 60) on gust generation experiments in wind tunnels. *Subject Headings:* **Aerodynamic turbulence seminars 2. Gust generation in wind tunnels 3. Hygrometry wind tunnels. 4. Aeronautical research conferences.**—*M.R.*

9.7–4 061.3:061.6:533.6

North Atlantic Treaty Organization. Advisory Group for Aeronautical Research and velopment, **Papers presented at the 6th Meeting of the Wind Tunnel and Model Testing nel, Paris, Nov. 2–6, 1954.** *AGARD Memorandum,* AG17/P7, (Sept. 1955), 440 p. figs., otos, refs.. **DWB** (533.6 N864p)—Contains 17 papers on various aspects of wind tunnel ting, by authors from France, England and the U. S. Most of the papers are concerned h hypersonic aspects, but material on calibration, accuracy, pressure determinations, scale ects, boundary conditions or effects (heat transfer, skin friction) is included. Tunnels of NACA (U. S.) and the National Aeronautical Establishment (U. K.) are described and strated in separate articles. *Subject Headings:* **1. Wind tunnel testing 2. Aeronautical earch conferences 3. North Atlantic Treaty Organization.**—*M.R.*

9.7–5 591.9:572.9 551.586:(

†Migliorini, Elio, **La terra e gli uomini: lezioni di geografia umana.** [The earth and i inhabitants: lessons in human geography.] 2 d ed. enl. Naples, R. Pironti e Figlii, 195 234 p. 29 figs., tables, 192 refs. **DLC**—In Ch. 18 on influence of environment there is section (p. 115–117) on the relation between climate and human activity, summarizing brief the qualitative ideas of HUNTINGTON and PETERSEN. On p. 117–119 the ideas of Y. M. MA on medical geography (1950) are given. Others cited are VOEĬKOV and MISSENARD. *Subje Headings:* **1. Human geography 2. Human climatology.**—*M.R.*

TEXTBOOKS

See also: **Upper atmos.** (Mitra), 9.7–17.

9.7–6 551.508.71(0

Spencer-Gregory, H. and Rourke, E., **Hygrometry.** N. Y., Pitman Pub. Corp., 195 254 p. 118 figs., 17 tables, 38 refs., eqs. Price, $7.95. **DLC** (QC915.56)—The most thorou treatment of all aspects, both practical and theoretical, of hygrometry since DE SAUSSURE famous **Essais sur l'Hygrométrie** published in 1783. After a preface outlining the history hygrometry since LEONARDO DA VINCI (1500) and the failure of all hygrometers to meet rig requirements, there is an introductory chapter describing about 10 types of hygrometers, the principles and calibration. Ch. II takes up the Vapor Pressure of Water and Ice; Ch. I Vapor Pressure of Solutions; IV) Dew Point Practice; V) Moisture Content of Highly Co pressed Gases; VI) the Assmann Psychrometer; VII) the Hair Hygrometer; VIII) t Diffusion Hygrometer; IX) the Gravimetric and Electrolytic Hygrometer, and X) Lag Effec Useful tables and derivations are appended or included in text, along with nomograms a empirical curves, etc. A good index is also included. The diffusion hygrometer is consider the most promising for development of an absolute hygrometer. *Subject Headings:* **1. H grometry 2. Hygrometers.**—*M.R.*

9.7–7 551.509.31(0

§Otani, Tohei and Saito, Shoichi (*comps.*), **Tenki Yoho to Tenkizu,** [Weather foreca and weather charts.] Tokyo, Japan, Hosei Univ., Nov. **1957.** 205 p. 102 figs., tables. Japanese. **DWB** (M09.31 087te)—A practical textbook on synoptic weather analysis a forecasting, with scores of synoptic examples illustrating the various cyclonic, anticyclon frontal and typhoon situations encountered in East Asia and Western Pacific. Codes, n works, communications, map plotting and frontal analysis, storm warnings, etc., are treat in introductory and final chapters. Typhoon tracks and frequencies, upper level char Northern Hemisphere charts, schematic diagrams showing processes of cyclogenesis, etc. included with the numerous full page synoptic surface charts for the Japanese region. *Subj Headings:* **1. Synoptic analysis textbooks 2. Forecasting in Japanese region 3. East A 4. Japan.**—*M.R.*

9.7–8 551.5:551.46(0

Coyecque, Marcel, **Nociones de meteorología general y náutica con elementos de ocea ografía.** [General and marine meteorology with elements of oceanography.] 2d ed. r and enlarged from the 2d French ed. Trans. by Joaquin Febrer. Barcelona, Gustavo G **1946.** 466 p. 265 figs., refs., eqs. **DLC** (QC861.C75 1946)—This modern text, which intended for students of marine meteorology, contains sections (with the usual chapters fou in meteorology texts) on descriptive, general, dynamic and synoptic meteorology and oceanography. The treatment is mainly by means of schematic diagrams rather than mat matical models. Emphasis in all sections is on marine aspects of meteorology or on stor forecasting, fog and other elements affecting oceanic areas. Likewise the climatology of sea and the effect of the sea on the continents is emphasized. The oceanography sect contains chapters on oceanographic observing equipment and methods, sea water properti floating ice and service for reporting and forecasting ice, waves and currents. *Subject Headi* **1. Marine meteorology textbooks 2. Translations. I. Febrer, J.** (*trans.*).—*M.R.*

9.7–9 551.5(02)

†Frasier, George Willard; MacCracken, Helen Dolman; Decker, Donald Gilmore; Mcughton, Daniel C. and Smith, Richard Avery. **Our scientific age.** Syracuse, L. W. ger Co., Inc., **1956.** 568 p. numerous figs. (incl. photos), refs. at end of each chap., bliog. p. 534–538. *Singer Science Series.* **DWB**—Sec. III (p. 219–327) of this beautifully d cleverly illustrated "modern" high school text on science, consists of a number of chapters the "science of earth, air and ocean", the Geophysical Year, the atmosphere (Ch. 20), navigation (Ch. 21), water on the earth (Ch. 22), use of water by man (Ch. 23), weather h. 24), weathering of rocks and soil (Ch. 25), geomorphology (Ch. 26), minerals (Ch. 27), d oceans (Ch. 28). The introduction to Sec. IV describes and illustrates the artificial th satellite and its orbits. Other chapters contain information on the aurora, ionosphere, lio propagation, sunspots, meteors, solar energy, air conditioning, etc. *Subject Headings:* **General science textbooks 2. Elementary meteorology 3. Textbooks.**—*M.R.*

9.7–10 551.582.1(77)

Garland, John Henry (*ed.*), **The North American Midwest: a regional geography.** N. Y., nn Wiley; London, Chapman and Hall, **1955.** 252 p. 80 figs., 26 tables, foot-refs., bibliog. 243–245. Price: $8.00. Review by Leslie Hewes in *Geographical Review*, N. Y., 57(1):145–, Jan. **1957. DLC**—Chap. II of this text on the economic geography of the Midwest innesota, Wisconsin, Michigan, Iowa, Illinois, Indiana, Ohio, Kentucky, Missouri and acent portions of bordering states) for college students, deals with weather and climate, nperature, precipitation, snow, evaporation, sunshine, wind and climatic changes with charts showing isolines of averages or numbers of days for several elements or criteria. the chapters on the 10 subregions there is also a brief discussion of the climatic conditions of h region, although the only one going into any detail is that for the Lower Ohio Valley, 196–199, which analyzes conditions at Lexington, Ky., as thoroughly as is possible in this e of a text. *Subject Headings:* **1. Regional climatology 2. Climate of Middle West Middle West, U. S.**—*M.R.*

9.7–11 551.5(02)

Day, John A. and Decker, Fred W. (*Dept. of Physics, Oregon State College*), **Rudiments of ather: the study of our energetic atmosphere.** Corvallis, Oregon, Oregon State College perative Association, **1955.** each chapter separately paged. numerous figs. Quiz at end each ch. **DWB**—This descriptive and elementary introduction to meteorology can serve h as a textbook for self-instruction and for a general course in meteorology suitable for eral liberal arts courses. The individual chapters cover the following: fronts, air masses, lones, etc.; cloud forms and their observation; the characteristics of the weather variables l methods of their observation; the energy basis of atmospheric motion; the nature of vective circulation; water vapor and energy storage and the water cycle; release of stored rgy, including the causes of precipitation; the large scale circulations, including cyclogenesis l anticyclogenesis, air masses, hurricanes, tornadoes, etc.; the planetary circulation as nifested at different altitudes; radiation in the upper and lower atmosphere; the nature of mal weather, its variation, climate, etc.; the effect of weather upon human activities; and ecasting. The book contains numerous diagrams and each chapter is provided with stions for self-testing. The U. S. W. B. **Manual of Cloud Forms and Codes for States he Sky** is included. *Subject Headings:* **1. General meteorology 2. Meteorology textbooks.** *L.D.*

9.7–12 551.576:551.55(02)

Bessemoulin, J. and Clausse, R., **Vents, nuages et tempêtes.** [Winds, clouds and storms.] is, Edition Plon, **1957.** 342 p. 77+21 illus. 34 refs. Price: 1500 Frs.—Current meological knowledge is presented in a manner accessible to students and the general public. subjects covered are: history of meteorology and invention of the principal meteorological ruments; results of meteorological observations; the era of synoptic meteorology; study he general atmospheric circulation; atmospheric disturbances, air masses, fronts; clouds, stream and its influence on aviation; action of wind upon the sea; short, extended and longge weather forecasting; the future of meteorology with particular attention to improvement

of observations, data transmission and forecasting; influence of man upon the atmosphere rain and fog. *Subject Headings:* **1. Meteorology textbooks 2. Synoptic meteorolog 3. Weather forecasting.**—*A.V.*

9.7–13 551.58(02) 551.584(02

*†Alisov, Boris P.; Drozdov, O. A. and Rubinshtein, E. S., **Lehrbuch der Klimatologi** [Textbook of climatology.] Berlin, Deutscher Verlag der Wissenschaften, **1956.** 16+535 160 figs., 6 fold. plates, numerous tables, 137 refs. **DWB.** Review by C. E. P. Brooks *R. M. S., Q. J.*, 38(356):282, April **1957.** Review by H. E. Landsberg in *A. M. S., Bull* 38(8):498–500, Oct. **1957.**—This is the German translation, apparently without change, the first two parts of their Russian **Kurs Klimatologii** which appeared in 1952 (*see* 4.8– Aug. 1953, *MAB*). It is a very thorough compilation, and though written with a stron Russian bias, it will be welcome to the numerous Western meteorologists who do not rea Russian easily. Pt. 3 by Alisov et al., appeared in 1954 (*see* 6.11–5, Nov. 1955, *MAB*) bu has not been translated. *Subject Headings:* **1. Climatology 2. Microclimatology 3. Tex books 4. Translations.**—*C.E.P.B.*

POPULAR SCIENCE BOOKS

See also: **Our scientific age** (Frasier et al.), 9.7–9; **Antarctica** (Markov), 9.7–41; **Amateur observers manuals** (Kuz'min, Matinian), 9.7–53; **Oceanography** (Epstein, Williams), 9.7–63.

9.7–14 551.5(

Perry, John, **The story of standards.** New York, Funk and Wagnalls, **1955.** 271 42 photos. **DWB**—An exceedingly readable account of the history of standards and units measurement of every kind, from the earliest antiquity to the most recent electronic computer and FOSDIC (Film Optical Sensing Device for Input to Computers) developed by the Bureau of Standards and to be used by the Census Bureau and U. S. Weather Bureau. Th history of thermometry, of rapid computers, of electrical and time standards, rad propagation forecasts, and many other activities of the National Bureau of Standards are interest to meteorologists as well as metrologists. A number of the instruments or piec of equipment developed by the N.B.S. for the Weather Bureau are mentioned, and these ar others illustrated. *Subject Headings:* **1. Metrology 2. Meteorological instruments.**—*M.*

9.7–15 551.5:656.6

§*Onodera, Michitoshi, **Kisho to Kainan.** [Weather and disasters at sea.] Toky Tenensha, July 30, **1956.** 3rd ed. 332 p. 164 figs., 25 tables. In Japanese. **DWB**—Th book contains 146 chapters arranged under 16 major headings, covering all types of weath disasters at sea, with the meteorological aspects stressed. Nearly every section is accor panied by synoptic charts covering the situation, schematic diagrams and soundings, cro sections, data, etc. Of course typhoon disasters play the leading role, a large portion of t text being devoted to typhoon case histories, analyses, warnings, paths, effects, dynamics, et Disasters due to ice, squalls, gales of extra-tropical origin, and other meteorological phenome (fog, snow, visibility, etc.) are treated. *Subject Headings:* **1. Marine disasters 2. Mari meteorology 3. Popular meteorology books 4. Typhoon disasters at sea 5. Japane language textbooks.**—*M.R.*

9.7–16 551.5:551.

Zerinváry, Szilárd, **A föld helye a világmindenségben.** [The earth's place in the u verse.] Budapest, Művelt Nép, **1954.** 106 p. 50 figs. (*Természettudományos Kiskönyvt* No. 104.) **DLC**—In this popular booklet general knowledge on the earth and its history summed up in four sections: 1) the earth as a planet, 2) origin of the earth, 3) its past, prese and future and 4) life on the earth. On p. 64–73, the radiation balance of the earth's atm sphere (diagrams show the distribution of the various types of radiation) and the gene circulation (schematic diagram) are discussed. A world map shows the distribution of dese along the belt of descending air masses. On p. 84, wind erosion and tornado damage

entioned in connection with changes on the earth's surface. *Subject Headings:* **1. Origin earth 2. Popular meteorology books.**—*G.T.*

TRANSLATIONS

See also: **Marine met. textbooks** (Coyecque), 9.7–8; **Climatology textbooks** (Alisov et al.), 9.7–13.

9.7–17 551.510.53(02)

*†Mitra, Sisir Kumar, **Verkhniaia atmosfera.** [Upper atmosphere.] Trans. by G. V. ozenberg and E. A. Makarov. Ed. by V. I. Krasovskii and Ia. L. Al'pert. Moscow, Izdat. ostrannoi Literatury, **1955.** 639 p. 37 tables, bibliog. p. 590–609, eqs. **DLC**—A complete, cely bound and well-edited translation into Russian of the 2d ed. of MITRA's well known xt on the upper atmosphere. Each of the main chapters contains the essential theoretical d technical details of the work of hundreds of scientists (up to 1951) in such fields as at-ospheric tides, ozone layer, CO_2 in upper atmosphere, ionospheric physics, electrocurrents, roras, magnetic storms, airglow, upper atmosphere temperature, rocket soundings, tem-rature and density from acoustical soundings and from meteoric observations, etc. The bliography, by chapters, contains over 1000 refs. (without titles); a good name and subject dex is also provided. (For 2d ed. of original English, *see* 4.8–15, Aug. 1953, *MAB.*) *Subject eadings:* **1. Upper atmosphere physics 2. Ionospheric physics 3. Translations of textbooks. Rozenberg, G. V.** (*trans.*) **II. Makarov, E. A.** (*trans.*).—*M.R.*

MONOGRAPHS

See also: **Antarctic glaciological studies** (Rivolier, Dyhamel), 9.7–39; **Man's role in changing the face of the earth,** 9.7–49; **Precipitation variations, Turkey** (Erinç, Tümertekin), 9.7–223; **Flood forecast economics, Lower Columbia River,** 9.7–244; **Water balance studies** (Erbe), 9.7–247; **Climatic classification, India** (Chatterjee), 9.7–249; **Weather obs. and forecasting** (Petterssen), 9G–103.

9.7–18 551.579:551.573

*van Hylckama, T. E. A., **The water balance of the earth.** Drexel Institute of Technology. b. of Climatology, Contract Nonr-1617(00), Technical Report, No. 2; Publications in matology, 9(2):59–116, **1956.** 14 figs., 21 tables, 58 refs. **DWB** (M8 D777p)—The annual cle of evapotranspiration per THORNTHWAITE and the resulting water balance is computed 14,000 locations all over the world, and the resulting water retention in 10 squares computed all land areas of the earth. It is shown that the greatest amount of water is retained by the ntinents in April ($.75\times10^{19}$ g more than in Sept./Oct.) confirming MUNK's estimation that greatest amount of storage occurs in the Oceans in Sept.–Oct. (excess Oct.–March $.5\times10^{19}$ ms). Regional variations and differences between the N. and S. Hemisphere detention imes are also shown. The storage in air is ignored—storage in vegetation is shown to be atively insignificant. Monthly charts with data entered thereon are presented for Eastern l Western Hemispheres, respectively. Certain specific regions are treated in fuller detail show techniques employed. *Subject Headings:* **1. Water balance of earth 2. Evapo-nspiration regime of land masses 3. Continents. I. Munk, Walter.**—*M.R.*

9.7–19 551.506:551.507.2(261)

*Netherlands. Meteorologisch Instituut, **Synoptic and upper air observations on Nether-ds weatherships and specially equipped selected ships, Vol. 1, 1956.** Issued De Bilt, **1957.** 3 p. Entirely tables. Price: F 12.50. "This yearbook (*Publication* No. 143), replaces b. No. 106A, **Upper Air Data** and Pub. No. 136, **Observations Weatherships,** effective 1. 1, 1956. **DLC**—Surface synoptic, radiosonde and upper air wind transmissions from ather Ships "Cirrus and "Cumulus on the way to and from and while at N. Atlantic tions A, I, J, K and M in 1956, plus reports from selected Netherlands ships in the area, listed by days from Jan. 1–Dec. 31 just as they are transmitted by radio. *Subject Headings:* **Netherlands weather ship data 2. Ocean weather stations 3. North Atlantic.**—*M.R.*

9.7–20 551.506.2:551.59

*Reiter, Reinhold, **Results of two year's synoptic atmospheric-electric recordings at seve mountain stations between 700 and 3000 meters above sea level.** Contract AF 61(514)-732-C Technical Report [unnumbered], June **1956.** 185 p. 110 figs. (incl. photos), 13 table 50 refs., 9 eqs.—A study made in 1954–56 of the behavior of the atmospheric potential gradien vertical electric currents, conductivity, and atmospherics under a variety of synoptic meteoro logical conditions, e.g., fine weather, ground inversions, fog and stratus, mid-tropospheri inversions, cosmic ray showers, altostratus or nimbostratus, thunderstorms, showers, driftin snow, föhn, mountain-valley wind transitions, etc. The network of stations around and o Zugspitze gave an excellent opportunity to study high altitude and orographic effects und varying meteorological, radioactivity or cosmic ray conditions. A total of 5000 diurnal recor sheets were evaluated with respect to meteorological conditions. Many of these (and othe graphs are appended. Applications are considered to forecasting fog and thunderstorm *Subject Headings:* **1. Atmospheric electricity investigation 2. Synoptic weather effects o atmosphere 3. Zugspitze, Bavarian Alps.**—*M.R.*

9.7–21 551.506.7:551.508.82

*Netherlands. Meteorologisch Instituut, **Upper Air Data,** Vol. 38, 1953. Its *Publicatio* No. 106A, Issued **1956.** Unpaged. Entirely tables. **DLC**—Beginning Jan. 1, 1956, thes **Upper air data,** as well as **Observations weatherships** (Pub. No. 136), is replaced by **Synopt and upper air observations on Netherlands weatherships,** Vol. 1, 1956 (*see* 9.7–19).—A larg volume containing a compilation of twice daily radiosonde data for surface to 100 mb mad at De Bilt and on Netherlands weather ships, Cirrus and Cumulus at stations A, J and K in th N. Atlantic and at Doggersbank in the North Sea, plus upper winds to 9 km four times dail for each day of each month of 1953. *Subject Headings:* **1. Radiosonde data 2. Upper air win data 3. Netherlands weather ships 4. De Bilt, Netherlands.**—*M.R.*

9.7–22 551.506:627.92(261.

*Netherlands. Meteorologisch Instituut, **Meteorologische en oceanografische waarnem ingen verricht aan boord van Nederlandse lichtschepen in de Noordzee.** [Meteorological an oceanographical observations taken from Netherlands ships in the North Sea.] Vol. 5, 195 issued De Bilt, 1957, and Vol. 7, 1955, issued **1956.** About 280 p. each. Mostly tables. "Vol. for 1954, issued 1956 is the first volume to be issued in this series." (From foreword, Vol. 7 (*See* 8.8–24, Aug. 1957, MAB for abstract of Vol. 6.) **DWB** (M07.2 N469m).—The meteor logical observations made every 3 hrs. at the Netherlands lightships: Noord Hinde Goeree, Texel and Terschellingerbank, and tidal observations made every hour at the stations are presented in detail in ten tables: I. Dry and wet bulb temp. of air, cloud cove II. Wind direction and speed and sea surface temp., duration of fog and precip.; III. Visibilit weather, and pressure; IV. Direction, period and height of waves; V. Time of high tide, etc VI. Average monthly air temp. and wet bulb; VII. Average wind direction, vectoral win velocity and scalar speed, vectorial constancy, average pressure, and cloudiness; VIII. Monthl frequencies of air-sea temp.; IX. Frequency of Beaufort wind force by direction and X. Monthl frequencies of wave heights according to direction and periods. *Subject Headings:* **1. Lightsh observational data 2. Netherlands lightships 3. Oceanographic data 4. North Sea.**—*M.*

9.7–23 551.577.37(7

*Riedel, J. T.; Appleby, J. F. and Schloemer, R. W. (*all, Hydrologic Serv. Div., U. S. W. B*) **Seasonal variation of the probable maximum precipitation east of the 105th meridian for are from 10 to 1000 square miles and durations of 6, 12, 24 and 48 hours.** *U. S. Weather Bureau Hydrometeorological Report,* No. 33, April **1956.** 58 p. 26 figs. **DWB**—Besides charts givi basic data on storm rainfall, dew points, etc., the basic theory, procedures, uses, and limitatio of the charts are outlined. Chart for eastern U. S. shows >32″ maximum 24-hour precipit tion for 200 sq mi along Gulf and <18″ in northwest N. Dakota and 12″ in north tip of Main Monthly charts show similar distribution but lesser values, except in summer. A chronologic list of >250 storms processed (1869–1951) is appended. Depth-area-duration relationsh curves for each of 9 zones show 6, 12, 24 and 48 hr. factors for 10 to 1000 sq mi drainages apply to 210 sq mi values given on isohyetal charts. *Subject Headings:* **1. Maximum possib precipitation 2. Rainfall depth duration curves 3. Eastern United States.**—*M.R.*

9.7–24 551.577(758) 551.579(758)

†*Thomson, M. T.; Herrick, S. M.; Brown, Eugene et al., **Availability and use of water in eorgia.** *Georgia. Dept. of Mines, Mining and Geology, Georgia Geological Survey Bulletin,* o. 65, **1956.** 329 p. 74 figs., 19 tables, 67 refs. **DWB**—Rainfall is discussed on p. 69–77,)–87, etc. Storage, evaporation, flood flow and data requirements are discussed on p. 106–113. ariations in stream flow, as deduced from 136 gaging stations are discussed and illustrated great length. Relation of rainfall to runoff, ground water, evapotranspiration, flood hydro-raphs, etc. are treated throughout and illustrated by histograms, isohyetal charts, correlation raphs and hydrographs as well as ample data tables. *Subject Headings:* **1. Rainfall in Georgia Hydrology of Georgia 3. Georgia.**—*M.R.*

9.7–25 551.501:551.311.1(261)

*U. S. Coast Guard, **International ice observation and ice patrol service in the North tlantic Ocean, season of 1953.** Its *Bulletin,* No. 39, **1955.** 138 p. 43 figs., 10 charts (fold.), merous tables. Also: **Season of 1954.** *Ibid.,* No. 40, **1955.** 168 p. 37 figs., numerous bles. p. 79–168, Soule, Floyd M. and Murray, J. E.: **Physical oceanography of the Grand anks Region and the Labrador Sea in 1954. DWB**—These two annual reports contain etailed ice, sea surface temperature and oceanographical data for the Newfoundland-Greenland ea for 1954, similar to that for 1950 (*see* 3.7–51, July 1952, *MAB*). Aerial ice observations nducted by the International Ice Patrol are presented in text, tables and monthly ice charts. onditions were "normal" after 3 yrs of light ice conditions; 312 bergs sighted S. of 48°N com-ared with normal of 404 for 1900–53. Ice pack did not reach S. of 47° at any time. Circulation ocean water down to 1000 m depth is presented, along with volume transport, minimum and ean temperature, and heat transport across Labrador current. Similar data are given in etail for other oceanographic sections in area. *Subject Headings:* **1. Ice movement charts North Atlantic Ice Patrol 3. Ocean temperature charts 4. Oceanographic data 5. Lab-ador Current 6. Northwest Atlantic. I. Bush, A. J.**—*M.R.*

9.7–26 523.746 550.385

*Greenwich, England. Royal Observatory, **Sunspot and geomagnetic-storm data derived om Greenwich observations, 1874–1954.** Comp. under the direction of Sir Harold Spencer nes. London, H. M. Stationery Office, **1955.** 106 p. numerous tables, graphs (fold.). **LC** (QC836.G7)—This well-edited catalog contains details of the 761 large sunspots, the 55 reatest sunspots, the 100-odd great geomagnetic storms, 697 small magnetic storms (1874–954), 54 great geomagnetic storms from 1840–1874, and a diagram showing comparative nspot and geomagnetic (Sq) curves for 1841–50. There is also a list of "spotless" days 874–1954. Annual and monthly values are given in tables. Extensive annotations cover nportant aspects of each major storm. *Subject Headings:* **1. Sunspot data 2. Geomagnetic torms 3. Long period sunspot records 4. Greenwich, Eng. I. Jones, Sir Harold Spencer.** -*M.R.*

9.7–27 551.579.4(794)

Blum, Richard H. and Klass, Bertrand, **Study of public response to disaster warnings.** *tanford Research Institute, SRI Project No. IU-1640, Report,* June **1956.** 174 p. 18 figs., bles. **DWB**—An extremely detailed analysis of 275 answers to questionnaires issued to eople who had come through the flood-disaster of Dec. 19–27, 1955, in the Yuba City, Marys-ille and Palo Alto areas of California. The flood warnings, public response; desire of public r better warnings, or for communication (radio, TV, newspaper or public address system ype of warnings) based on reaction to these warnings in the actual flood, are given as a con-usion to the actual experiences reported within a month after the flood. Answers are tabu-ted and shown graphically. *Subject Headings:* **1. Flood warning effectiveness 2. Disaster arnings 3. Floods, California (Dec. 1955) 4. Feather River, Calif.**—*M.R.*

9.7–28 628.1:551.579

*California. Dept. of Water Resources, **The California water plan.** Its *Bulletin* No. 3, lay **1957.** 246 p. numerous photos, 30 tables, numerous charts (fold., in color). "Third nd final of series of pubs. of comprehensive investigation of water resources of California."

DWB (631.7 C153c, No. 3)—In Ch. 2 of this voluminous and elaborate report, the water resources (precipitation, runoff, ground water, water requirements, water deficiency at present and future, flood problems, drainage and power problems, etc.) are discussed. Details for each separate basin are presented in ensuing chapters, accompanied by photographs, large colored maps and tabular data. Water development planning is emphasized. Plate 2 is a large color chart of California showing precipitation and runoff categories (1897–1947). *Subject Headings:* **1. Isohyetal charts 2. Water resources 3. California.**—*M.R.*

MANUALS AND ATLASES

9.7–29 551.509(02)

§Penn, Samuel (*U. S. W. B. Airport Station, Boston*), **Forecast manual for New England.** Wash., D. C., U. S. Weather Bureau, Oct. **1957.** 40 p. 21 figs., 19 refs. **DWB** (M09 U587fo)—A revision of a previous manual for New England, giving emphasis to recent developments in long-wave theory, numerical prediction methods, etc. The manual is divided into 4 main sections, each one covering a season. Under *Winter*, 4 major subjects: I. Precip., II. Temp., III. Cold and warm fronts and IV. Strong winds are discussed. In the *Spring* section: I. Precip., II. Blocking, III. Temp., IV. Fire weather, and V. Sea breeze. Under *Summer:* I. Precip., II. Drought, III. Cold fronts, IV. Temp.; V. Humidity, VI. Stratus and fog, VII. Wind; and in *Fall:* I. Precip., II. Temp., III. Wind and IV. Fog. The problem of snow vs. rain, ice storms, cold waves, fire weather and sea breezes come in for fairly lengthy discussion and some objective rules are laid down. Tornadoes and hurricanes are not given much space. Many synoptic examples including aerological soundings and nomograms are appended. *Subject Headings:* **1. Forecasters manuals 2. Forecasting for New England 3. New England.**—*M.R.*

9.7–30 551.509.324.2(02)

§†Penn, Samuel (*U. S. W. B., Boston*), **Prediction of snow vs. rain.** *U. S. Weather Bureau, Forecasting Guide*, No. 2, Nov. **1957.** 29 p. 43 figs., 10 tables, 24 refs. **DWB** (M09.3 U587fo)—The regional, seasonal, physical and statistical as well as synoptic aspects of snow/rain in areas and times of the year where either snow or rain may occur are discussed and illustrated by nomograms, sounding diagrams, climatological and statistical charts and illustrative synoptic charts for snowstorms in various parts of the U. S. Both objective and physical-synoptic methods of prediction are treated. Radar observations provide important clues to understanding the processes taking place in the critical areas or levels. Synoptic examples are given for Denver, Salt Lake, Boston and New York City. Objective methods use local surface temperatures, upper air temps., thicknesses and height of freezing level or a combination of these as parameters. *Subject Headings:* **1. Forecasting snow vs. rain 2. Objective snow forecasting 3. Synoptic examples of snow storms 4. Snow-rain probabilities 5. United States.**—*M.R.*

9.7–31 551.582.3(5)

*Japan. Hydrographic Department, **Soto-Nanyo Homen Heiyo Kisho-Zu.** [Strategic meteorological atlas of South East Asia.] **1944.** 241 plates with text. In Japanese. **DLC (Orientalia, Japanese, uncat).**—Plate 1. General characteristics of the meteorological conditions over SE Asia, from 15°S to 35°N and from 90°E to 130°E, in tabular form. List of name of localities. Plates 2–5. List of the meteorological characteristics at strategic localities in four charts. Plates 6–17. Monthly charts of prevailing winds for the respective 1 degree square of latitude and longitude. Plates 18–29. Monthly charts of the Baillie type wind roses for the respective 5 degree square of lat. and long. Plates 30–41. Monthly frequencies of calm, gale wind and hurricane wind (0–3, 6–7 and ≥ 8 in Beaufort wind forces, respectively) with the tracks of well developed cyclones. Plates 42–53. Monthly histograms showing swell of various degrees divided according to frequencies of winds of various Beaufort wind forces. Plates 54–65. Monthly histograms showing wind forces according to the Beaufort wind scale divided according to frequencies of weather of various types. Plates 66–77. Monthly wind roses divided according to frequencies of weather of various types. Plates 78–89. Monthly histograms showing the weather of various types. Plates 90–101. Monthly charts showing frequencies of the weather of various types at 0600, 1200, 1800, and 2400 (local time). Plate

2. Annual regime of precipitation. Plate 103. Annual regime of the monthly number of days precipitation. Plates 104–115. Monthly charts showing the distribution of the amount of ecipitation. Plates 116–127. Monthly charts showing the distribution of number of days precipitation. Plate 128. Annual regime of the possible duration of sunshine. Plate 129. nnual regime of cloudiness. Plates 130–131. Charts showing distribution of cloudiness for nuary and July. Plates 132–143. Monthly histograms showing ceiling during overcast eather. Plates 144–155. Monthly histograms showing visibility of various scales at 0600, 00, 1800 and 2400 (local time). Plates 156–167. Monthly charts showing the frequency of servations when a seaplane can or cannot land on the respective 5% square. Plates 168–239. onthly charts showing the Baillie type of upper air wind roses at 1000 m, 2000 m and 3000 m vels over S.E. Asia and the upper air wind roses at more than so selected stations in the me area. Plate 240. Monthly charts showing the distribution of barometric pressure. ate 241. Annual regime of air temperature. *Subject Headings:* **1. Climatic atlases 2. South-st Asia.**—*H. Arakawa.*

9.7–32 551.557.2(912)

§*Serebreny, Sidney M.; Wiegman, Eldon J. and Hadfield, Rex G., **Study of jet stream nditions in the Northern Hemisphere during summer.** Pan American World Airways, Inc. eteorology Dept., Contract N600(188)-44188 (Project AROWA), Technical Report, No. 6, ct. 1957. 111 p. 17×14 in. 50 figs., 10 refs., appendix of tables. **DWB** (M57.2 P187st)—comprehensive atlas of jet stream data with illustrative synoptic charts for the Northern emisphere north of 50° lat. during June, July and Aug. The source of data was the Northern emisphere Historical Series of surface and 500 mb charts for Jan. 1947–June 1955 (un-blished maps were used for the last 2 yrs). A few 300 and 200 mb charts were constructed. he atlas is divided into 2 parts: I. A census of jet stream occurrence in the Northern Hemi-here by months (June–Aug.) and for the season, and II. A climatological catalog and discus-on of the jet stream, patterns associated with specific blocking conditions: A) Greenland-eland block; B) England-North Sea block; C) Scandinavian-Russian block; D) the Ural ock; E) Central Siberian block; F) Manchurian-Okhotsk Sea block; G) Kamchatkan block;) Alaskan block; I) Sub-Aleutian block; and J) the Central Canadian block. Synoptic arts for the entire N. Hemisphere illustrating each type consist of: 1) a 500 mb topographic art; 2) a 300 mb chart showing in broad blue lines the location of the various jet streams; a 200 mb chart; 4) frequencies of anomalies; 5) incidence of jet stream centrums at 500 mb vel and a number of charts showing examples of 3–5 day jet stream locations. Summer jet reams data are compared with that for winter. North of 50° jet streams are stronger in mmer than in winter. *Subject Headings:* **1. Jet stream atlas 2. 500 mb blocks 3. Upper r climatology 4. Northern Hemisphere charts 5. Northern Hemisphere.**—*M.R.*

GENERAL GEOPHYSICS AND METEOROLOGY

IGY

See also: **Antarctic stations, U. S.** (Pellisari), 9.7–40; **IGY satellite program** (Newell), 9.7–68; **Artificial satellites** (Carter), 9.7–69; **IGY satellite program** (Kraft), 9.7–70.

9.7–33 551.506:551.510.35:550.3:061.3

Orsini, Luiz de Queiroz, **O programa de trabelhos em ionosfera, nas Americas.** [Program activities in the ionosphere in the Americas.] *Ciencia,* Mexico City, 16(11/12):305–307, 56. fig., table. **DWB**—A list of 40 Western Hemisphere ionospheric sounding stations oposed for IGY (83°N–78°S) is included in this article describing the various types of nospheric data or studies to be made during IGY. *Subject Headings:* **1. IGY ionospheric ogram 2. Western Hemisphere.**—*M.R.*

9.7–34 551.507.362.2:550.3:061.3

Pickering, W. H., **Scientific observations of the IGY satellite.** *Ciencia,* Mexico City, (11/12):335–338, 1956. **DWB**—Various aspects of the orbit, observing stations, in-umentation and data are discussed. *Subject Heading:* **1. IGY satellite program.**—*M.R.*

9.7–35 551.594.5:551.506.22

Currie, B. W., **IGY aurora and airglow program.** *Ciencia*, Mexico City, 16(11/12):309–316, **1956.** 5 tables. **DWB**—Special problems and techniques to be used during IGY in the auroral and airglow program, a list of the 100 Western Hemisphere stations from pole to pole making or intended to make visual, photographic and photoelectric observations of auroras, a list of 23 stations to make patrol-type spectrographic observations, 12 stations to operate high resolution spectrographs and photoelectric scanning spectrometers during IGY, 13 stations to make auroral radar studies and 10 stations to make airglow observations, and a detailed account of the Canadian auroral program are included in this informative article. *Subject Headings:* **1. IGY auroral program 2. Auroral networks 3. Airglow network 4. Canada 5. Western Hemisphere.**—*M.R.*

9.7–36 551.506.22:551.507.362.2

Kaplan, Joseph (*Univ. of Calif., Los Angeles*), **The International Geophysical Year program of the United States.** Secretary's abstract. *Washington Academy of Sciences, Journal* 47(1):26–27, Jan. **1957. DWB, DLC**—Brief comments on plan, scope, cost, and the IGY satellite program. *Subject Headings:* **1. IGY satellite program 2. U. S. participation in IGY.**—*M.R.*

9.7–37 550.3:061.3

[Kaplan, Joseph], [**U. S. National Committee for the IGY**]. *Science*, Wash., D. C. 122(3170):588, Sept. 30, **1955. DLC**—Note on staff and program of U. S. National Committee for IGY. Appropriations to date have been about $12 million. *Subject Headings:* **1. IGY, program 2. U. S., IGY committees.**—*M.R.*

9.7–38 551.594.5 551.521.326

Chapman, S., **Aurora and airglow.** Report from Subject group IV, of International Union of Geodesy and Geophysics, at the 10th Assembly, Rome **1954.** 7 p. refs. Mimeo.—Objectives of aurora and airglow program suggested for IGY, 1957–8 are set forth and visual, photographic, spectroscopic, radio-auroral, rocket auroral and airglow measurements planned are described in some detail. *Subject Headings:* **1. Auroral investigations 2. Night airglow investigations 3. IGY program.**—*M.R.*

WMO

See: **Aeronautical met.,** 9.7–76.

ARCTIC AND ANTARCTIC RESEARCH

See also: **Clothing climate, Arctic** (Woodcock et al.), 9.7–94.

9.7–39 551.311.

Rivolier, J. and Dyhamel, J., **Terre Adélie 1952: éléments d'étude de la glace de mer dans l'Archipel de Pointe Géologie.** [Adélie Land, 1952; elements of study of sea ice in Pointe Géologie Archipelago.] *Expéditions Polaires Françaises, Expéditions Antarctiques, Résultats Scientifiques, Ser. S, II* (*Sciences Géographiques*), [Unnumbered pub.], **1956.** 59 p. 26 figs., 20 photos, 14 tables, Glossary, p. 49–53. English and German summaries, p. 54–55. **DWB** (551.311 R616te)—A monograph giving in time cross-sections, tables, photographs and text the results of the 1952 glaciological (land and sea ice) studies at Pointe Géologie, Terre Adélie, 140°01′E, 66°40′30″S. Thickness of ice and snow, type, mechanical strength, electrical resistance, salinity, temperature and density are among the parameters observed and analyzed. Movements, formations such as rivers, air pockets, crevices, pack ice and their inter-relations are also treated. A glossary of terminology is appended. Equipment and methods of observation are fully described and illustrated with photos and line drawings. *Subject Headings:* **1. Antarctic glaciological studies 2. Glaciological observations 3. Pointe Géologie, Adélie Land.**—*M.R.*

9.7–40 550.3:061.3(99):551.506.22

Pellisari, L., **Stazioni scientifiche Americane nell'Antartide.** [American scientific stations n the Antarctic.] *Rivista di Meteorologia Aeronautica*, Rome, 17(2):65, April/June **1957.** **)LC**—Location and program of U. S. Antarctic stations for IGY is given. *Subject Headings:* **. U. S. participation in IGY 2. Antarctic stations.**—*M.R.*

9.7–41 551.506.5:551.582(26,99) 91.04(99)

Markov, K. K., **V Antarktidu.** [In the Antarctic.] *Priroda*, 45(8):59–70, **1956.** 17 gs. (part col.), 2 maps. **DLC**—The author describes the course of the expedition ship "Ob" owards the Antarctic with special attention to the characteristics of the marine climates in ts course (oceanic climates being shown on a map), the climates and oceanic conditions in ntarctic waters, the establishment of camp in Antarctica, ice, glacial weather conditions, etc. his is a general and popular account of the voyage and contains numerous photographs of onditions in Antarctica. *Subject Headings:* **1. Antarctic expeditions 2. Marine climates . Antarctica.**—*I.L.D.*

OBSERVATORIES

See also: **Lamont Geol. Obs.** (Gray), 9.7–48.

9.7–42 551.501.9:537.59

El Laboratorio de Física Cósmica de Chacaltaya, Bolivia. [Laboratory of Cosmic Physics, Chacaltaya, Bolivia.] *Pan American Union, Ciencia y Tecnologia*, 5(17):65–67, April/June **955.** photos. **DPU**—Laboratory at 5200 m is an extension of the climatological-synoptic bservatory begun in 1942 under ISMAEL ESCOBAR's leadership. Buildings and equipment are escribed and illustrated and the scientific and educational program outlined. *Subject Heading:* **. Cosmic physics laboratories.**—*M.R.*

9.7–43 551.501.9:551.508.21:551.521.12

*§De Pasquale, Oreste, **La rete attinometrica del Servizio Meteorologico dell'Aeronautica: isultati del primo anno di misure della radiazione globale.** [The actinometric network of the Meteorological Service of the Italian Ministry of Air: results of the first year of global radiation neasurement.] *Rivista di Meteorologia Aeronautica*, 16(4):5–22, Oct./Dec. **1956.** 4 figs., tables, 14 refs., eqs. French, English and German summaries p. 5. **DWB**—Details are iven on the Italian actinometric network set up by the Weather Service of the Italian Air orce, including 25 stations using Robitzsch-Fuess actinometers, while the station of the Massina Observatory which is responsible for controlling and working out data, makes use of n Eppley-Brown recorder, of an Ångström absolute pyrheliometer and of a direct reading Kipp & Zonen apparatus. Tables and synoptic charts are presented, relating to the first ear of observation (July 1954–July 1955), and suggestions are made for possible applications. *ubject Headings:* **1. Actinometric networks 2. Actinometers 3. Actinometric observations . Italy.**—*Author's abstract.*

SOCIETIES, INSTITUTIONS AND SERVICES

See also: **Actinometric network of Italian Air Ministry** (De Pasquale), 9.7–43; **Oceanographic research, China** (Bogorov, Dobrovol'skil), 9.7–64.

9.7–44 551.509.31

Meyer, Hans Klaus, **Arbeitsunterlagen der Analysenzentrale.** [Working bases of the nalysis Center.] *Germany. Deutscher Wetterdienst, Mitteilungen*, No. 10:24–30, Feb. **1955.** figs. **DWB**—After having pointed out that the most important tasks of the Analysis Center n Frankfurt are: 1) dissemination of reports in the German and international channels;) compiling large-scale analyses; 3) construction of prognostic charts; 4) issue of daily weather eports; 5) preparation of basic material for medium-and-long range forecasts and for research ork—the author describes and discusses the various kinds and forms of maps (mostly in :20 mill. scale) which have to be prepared and analyzed daily by the Center. They are: rface maps (every 3 hours); upper air analysis and prognostic charts. Charts show synoptic

and aerological reporting networks and distribution of all functions of Analysis Center. *Subject Headings:* **1. Synoptic analysis 2. Synoptic forecasting 3. Prognostic charts 4. Germany.**—*A.M.P.*

9.7–45 551.509.31 551.501.9

Clausse, Roger (*Chief of Information, Météorologie Nationale, Paris*), **Comment prevoit-on le temps?** [How can one forecast weather?] Conférence at the Palais de la Découverte, Nov. 13, 1954. Paris, **1954.** 20 p. 7 figs. *Les Conférences du Palais de la Découverte, Ser. A*, No. 195. **DLC**—A brief, illustrated pamphlet describing the synoptic forecasting service of France, the networks of weather stations, the communication channels, forecast procedures, service aspects, weather maps, long range forecasting, etc. *Subject Headings:* **1. Synoptic forecasting 2. Meteorological services 3. Meteorological stations 4. France.**—*M.R.*

9.7–46 551.508(02)

Les Nouvelles de Haenni, No. 1, Jan. 1946–. Latest issue seen, No. 63, Jan/March **1957.** Irregular. Issued by Haenni & Cie., S.A., Jegenstorf, Switzerland. diagrs., photos. **DWB** (M05 N934n)—A loose-leaf collection of small illustrated periodical pamphlets (issued every 2 or 3 months) intended for manufacturers and clients describing meteorological and commercial instruments developed or produced by the Haenni Co. in Switzerland. Useful tables are included in some issues. Pressure, temperature and humidity instruments of all types manufactured by this company are listed in the first issue. Recording and direct reading instruments, instruments for use of airplanes, combined instruments and various systems of manometers, thermometers and hygrometers are discussed and illustrated in different issues. A subject index to No. 1–50 is found in No. 51 for July/Sept. 1954. *Subject Heading:* **1. Instrument circulars.**—*M.R.*

9.7–47 551.5:061(899)

Marx, Edward H. (*U. S. Civil Aeronautics Administration*), **Estudio del Servicio Meteorológico del Uruguay.** [Study of the Meteorological Service of Uruguay.] Pref. signed, Montevideo, Uruguay, Sept. 5, **1956.** 10 p. chart. **DWB** (M03 M392es)—Administrative structure and operational practices of the Meteorological Service of Uruguay are critically examined. Extensive recommendations aimed at an improvement of the service are included. *Subject Heading:* **1. Uruguay. Meteorological Service.**—*G.T.*

9.7–48 551.46

Gray, George W., **The Lamont Geological Observatory.** *Scientific American*, New York, 195(6):83–94, Dec. **1956.** 10 photos. **DWB, DLC**—A brief description of the location and history of the Lamont Geological Observatory of Columbia Univ. are presented and an account of the research problems investigated by the Observatory since its inception is given. The first studies on the structure of the ocean floor by means of a seismograph; other techniques to study the ocean floor such as coring devices, thermocouples to record temperatures, etc. are described. The structure of the ocean core, the distribution of sediment over the ocean floor, the distribution of life in the seas at great depths, the dating and chemical evolution of oceanic matter, etc. (all these problems investigated by the Lamont Geological Observatory) are discussed. *Subject Headings:* **1. Columbia Univ. Lamont Geological Observatory 2. Ocean cores 3. Oceanographic research.**—*I.L.D.*

CONFERENCES AND SYMPOSIA

See also: **Alaskan Science Conference,** 9.7–1; **Aerodynamic turbulence seminars,** 9.7–3.

9.7–49 551.509.6(08)

International Symposium on Man's Role in Changing the Face of the Earth, Princeton, N. J., June 16–22, 1955, **Man's role in changing the face of the earth.** Ed. by William L. Thomas, Jr. Published for the Wenner Gren Foundation for Anthropological Research and the National Science Foundation by Univ. of Chicago Press, **1956.** 1193 p. figs., photos, maps, bibliog. at end of most ch, **DLC.** Review by B. T. Dickson in *Science*, Wash., D. C.,

25(3238):123, Jan. 18, **1957.** Review in *Scientific American*, N. Y., 196(2):142, Feb. **1957.**—eview by F. H. W. Green in *Geographical Journal*, London, 123(1):111–112, March **1957.** eview by L. Dudley Stamp in *Geographical Review*, 47(4):597–600, July **1957.** Review by . E. P. Brooks in *American Meteorological Society, Bulletin*, 38(7):435–436, Sept. **1957.**—he contents of this volume are results of an international symposium held during May 1955 t Princeton, N. J., under the auspices of the Wenner Gren Foundation for Anthropological esearch and the National Science Foundation. The various aspects of man's role in changing ie face of the earth are treated in the past, the present and the future. In this comprehensive eatment of man's ecology, there are a number of papers which are concerned with meteoro-gical and climatological problems and which are abstracted separately. (For listing of ontents, *see* Pt. III, p. 1425, Oct. 1957 *MAB.*) *Subject Headings:* **1. Man's influence on ature 2. Symposia. I. Man's Role in Changing the Face of the Earth II. Thomas, Wil-am L., Jr.** (*ed.*).—*I.L.D.*

9.7–50 551.585.5 551.581(213)(8)

International Geographical Congress, 18th, Rio de Janeiro, August 1956, [**Summaries papers**]. *Revista Geográfica* (of Instituto Pan-American de Geografia e Historia), Rio de aneiro, 19(45):1–184, **1956.** Also: Meigs, Peveril, **International Geographical Congress.** *Vorld Meteorological Organization, WMO Bulletin*, 6(2):82–83, April **1957. DWB.** Also: avitaia, F. F., **Geograficheskiĭ Kongress v Brazilii.** [Geographical congress in Brazil.] *Meteorologiia i Gidrologiia*, No. 1:59–60, Jan. **1957. DWB, DLC**—Some 200 papers dealing ith a variety of subjects in the different branches of geography are presented in summary form . **Revista Geografica.** The papers in climatology are summarized on p. 54–67, as follows: LPERT, LEO (U. S.): **Possibilities of initiating rainfall in Puerto Rico by means of cloud eeding,** p. 54. BASSOLS BATALLA, ANGEL, (Mexico): **Geographical criterion for setting up a etwork of meteorological stations,** p. 54–55. BLÜTHGEN, JOACHIM (Germany): **Synoptic lationship between equatorial and extratropical climates,** p. 55–56. CAPITANELLI, RICARDO . (Argentine): **Les classifications climatiques et leurs applications régionales,** [Climatic assifications and their regional applications], p. 56–57. COLE, MONICA MARY (England): **emperature and humidity analysis: a new technique,** p. 57. DAVITAIA, F. F. (U.S.S.R.): **e changement de climat par les facteurs anthropogènes,** [Climatic changes due to man-made ctors], p. 57–58. FAISSOL, SPERIDIÃO (Brazil): **Climatic conditions in the Distrito Federal,** 59. SAMPAIO FERRAZ, JOAQUIM DE (Brazil): **Solar activity and rainfall in southeastern razil: probable connections,** p. 59. KONČEK, MIKULÁŠ (Czechoslovakia): **L'indice d'ar-sage,** [Moisture index], p. 59–62. LAUER, W. (Germany): **Problems of classification and ethods of delineation of tropical climates,** p. 62. LAUTENSACH, HERMANN (Germany): **The nual march of the rates of temperature decrease with altitude in the different regions of the orld,** p. 62–63. MAIO, CELESTE RODRIGUES (Brazil): **Map of the index of aridity of north-stern Brazil,** p. 63. MARTINEZ RODRIGUEZ, IGNACIO (Uruguay): **Classification du climat l'Uruguay: le climat de l'Uruguay n'est pas un climat semi-aride,** [Classification of the mate of Uruguay: the climate of Uruguay is not a semi-arid climate], p. 63–64. VILA, ABLO (Venezuela): **Les grandes aires climatiques du Venezuela,** [The general climatic gions of Venezuela], p. 64–66. WEBB, KEMPTON E. (U. S.): **The climates of northeast razil according to the Thornthwaite classification,** p. 66–67. *Subject Headings:* **1. Geo-aphical conferences 2. Arid zone climatology 3. Climate of South America 4. South nerica.**

9.7–51 626:061.3

Mikulski, Z., **VI Kongres Medzynarodowej Asocjacji Badán Hydraulicznych (IAHR) w adze.** [6th Congress of the International Association for Hydraulic Research at the Hague.] *zegląd Geofizyczny*, Warsaw, 1(1):77–79, **1956. DLC**—Minutes of the Congress attended about 180 participants. Eighty-three reports were presented in summaries, they were vided in 4 sections dealing with: 1) hydraulics of river mouths and model investigations in at field; 2) modern measuring equipment; 3) hydraulics of outlets; 4) various problems. The rticipants made several interesting and instructive excursions to the water laboratory at elft, Guiderkee, etc. *Subject Headings:* **1. Hydraulic conference 2. International Associa-n for Hydraulic Research.**—*A.M.P.*

EDUCATION, HISTORY AND BIOGRAPHY

EDUCATION

9.7–52 551.542.1:551.552:551.46

Kosiba, Aleksander (*Uniwersytet Wrocławski im. B. Bieruta*), **O działaniu sił odchylającyc przy pradach atmosferycznych i wodnych na kuli ziemskiej: przyczynek do metodyki nauczania meteorologii.** [On the action of deflecting forces on air and water currents: a contributio to teaching methods in meteorology.] *Przegląd Geofizyczny*, Warsaw, 1(1):37–47, 1956 3 figs., 2 tables, 4 eqs. English summary p. 47. **DLC**—In view of the often encountered vagueness and even misinterpretation in schools, universities, popular scientific books and text books on the origin and effect of the Coriolis and centrifugal deflecting forces on air and wate currents, the author presents a simple and comprehensible method of explaining the action o these forces, both by zonal and meridional motion. *Subject Headings:* **1. Coriolis effects on currents. 2. Meteorological education.**—*A.M.P.*

9.7–53 551.5(02

†Kuzmin, L. A. and Matinian, G. B., **Meteorologicheskie nabliudeniia v shkole.** [Me teorological observations in school.] Leningrad, Gidrometizdatvo, **1956.** 167 p. 47 figs., forms, 35 refs. **DWB, DLC**—The first edition of this high school text on practical observatio work (*see* 7.2–6, Feb. 1956, *MAB*) covered quite thoroughly the concept, history, scope an usefulness of meteorology, the basic meteorological elements, instruments, surface weathe observations of all types, phenological observations, establishing a simple station, local o synoptic forecasting, and finally climatology and its importance. Sample observation form are appended, with detailed instructions for recording and working up the data. Emphasis i on agricultural (micrometeorological soil, snow cover and plant) applications rather tha aerological. The second edition contains some minor revisions and additions (amounting t 20 more pages and 8 more refs.). *Subject Headings:* **1. Meteorology in high schools 2. Ama teur observers manuals.**—*M.R.*

HISTORY

See also: **Hist. of dendrochronology** (Studhalter), 9.7–88; **Historic sea level data, Caspian sea** (Kazancheev), 9.7–253.

9.7–54 52:92(09

Paluzie Borrell, Antonio, **Astrónomos de humilde cuna.** [Astronomers of humble birth. *Urania*, Barcelona, 41(243):77–82, April/June **1956. DWB, DLC**—Among 37 astronomers c lowly birth whose careers are highlighted in this article (alphabetically arranged) are: D'Alam BERT (1717–83), Bessel (1784–1846), Flammarion (1842–1925), Fourier (1768–1830) Gauss (1777–1855), Lambert (1728–77), Laplace (1749–1827) and Newcomb (1835–1909) *Subject Headings:* **1. History of astronomy 2. Biographies of astronomers.**—*M.R.*

BIOGRAPHY

9.7–55 551.46:9

Dobrovol'skiĭ, A. D., **Iu. M. Shokal'skiĭ kak okeanograf.** [I. M. Shokal'skiĭ, ocean ographer.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geog.*, No. 2:120–123, **1957.** Komkov A. M., **Iu. M. Shokal'skiĭ kak kartograf.** [I. M. Shokal'skiĭ, cartographer.] *Ibid.*, 123–12 **1957.** 10 refs. Simonov, I. M. and Egor'eva, A. V., **Nauchnaia sessiia pamiati luliia Mi khaĭlovicha Shokal'skogo v Geograficheskom obshchestve SSSR.** [Scientific session of th Geographical Society of the USSR, dedicated to Iu. M. Shokal'skiĭ.] *Ibid.*, 127–134, 195 Rogov, A. B., **Pamiati Iu. M. Shokal'skogo.** [In memory of Iu. M. Shokal'skiĭ.] *Ibid* 124–136, **1957. DWB**—In the article by Dobrovol'skiĭ, the activity of Iu. M. Shokal'ski one of the founders of the science of oceanography, is discussed and his most important work are reviewed briefly. Article by Komkov relates Shokal'skiĭ, a tireless promoter and perfec connoisseur of maps, closely to the development of Russian and Soviet cartography and pr sents a detailed survey of his activities in this field. In the article by Simonov and Egor'eva the transactions of a joint commemorative scientific session of the Academy of Sciences, th

eographical Society and the Hydro-meteorological Service of the U.S.S.R., and other learned rganizations on Dec. 6–8, 1956, dedicated to the 100th anniversary of SHOKAL'SKIĬ's birth re given at some length. In the article by ROGOV, minutes of a scientific meeting at the loscow branch office of the Geographical Society of U.S.S.R. on the occasion of the 100th nniversary of SHOKAL'SKIĬ's birth (1856–1940), biographical details of the life and career of is famous geographer-oceanographer are enumerated. *Subject Headings:* **1. Biography of . M. Shokal'skiĭ 2. Shokal'skii, Iu. M.**—*A.M.P.*

9.7–56 551.5:92

Jeränen, J., **Johan Jacob Nervander, founder of the Magnetic-Meteorological Observatory Helsinki, 1805–1848.** *Geophysica*, Helsinki, 6(1):30–35, **1957.** photo. **DLC**—A bio- raphical sketch of the life of JOHN J. NERVANDER, who established and directed the Magnetic- leteorological Observatory in the park at Kaisaniemi on the outskirts of Helsinki. The resent headquarters of the Finnish Met. Office is on the same grounds. NERVANDER made any magnetic and meteorological inventions and studies, some of which were in respect to ie relation of temperature, freezing and break-up of ice, etc. to sunspots, and the rotation eriod of the sun. The first yearbooks, with hourly observations, appeared in 1846. He died ıddenly of smallpox in March 1848. *Subject Headings:* **1. Biography of J. J. Nervander Magnetic-Meteorological Observatory, Helsinki 3. Nervander, J. J.**—*M.R.*

9.7–57 551.5:92

[Obituary of] Georges Bidault de l'Isle. *La Météorologie*, Paris, No. 42:156, April/June **956.** In French. **DWB**—G. BIDAULT DE L'ISLE, a lawyer and amateur meteorologist, ıthor of numerous articles on various meteorological observations and on weather lore, died February 1956 at the age of 81. At the astronomical and meteorological observatory he uilt on his property, weather observations were carried out daily from 1922 to 1955. *Subject leadings:* **1. Obituaries 2. Bidault de l'Isle, Georges.**—*G.T.*

9.7–58 551.5:92

[Biographical note on] Bernard Peters, President, Section of Physics, 43rd session of ndian Science Congress Association, Agra, Jan. 1956. *Science and Culture*, Calcutta, 21(7), an. **1956.** *Supplement*, p. 18. port. **DLC**—Famous for cosmic ray research since 1947. orn in Germany in 1910, trained in Freiburg—went to U. S. in 1934 and Berkeley in 1938, h.D. in 1942, Atomic research in war, spent 5 months in India on cosmic ray investigation in 950, chairman of experimental Physics at Tata Institute, Bombay (1951-date). Lately, he as studied effect of cosmic rays in producing radioactivity at the earth's surface. *Subject leadings:* **1. Biography of Bernard Peters 2. Cosmic Ray research.**—*M.R.*

DOCUMENTATION

9.7–59 535.8:551.521

†Gardner, Irvine C. and Hahner, C. H., **Research and development in applied optics and ptical glass at the National Bureau of Standards: a review and bibliography.** *U. S. National ureau of Standards, Miscellaneous Publication*, No. 194, July 15, **1949.** 20 p. 16 figs., 195 fs. **DWB** (535.8 G226r), **DLC**—Various fields of optical research conducted by the NBS re reported and illustrated, and a classified bibliography appended, giving titles of papers in ese subjects by various NBS staff members. Radiative properties of glass (lenses and ters) constitutes one of the important fields of investigation and testing. *Subject Heading:* **Radiative properties of glass.**—*M.R.*

9.7–60 551.5:025.45

Bull, G. A. (*Met. Off., Harrow*), **Note on Universal Decimal Classification.** *Royal Me- orological Society, Quarterly Journal*, 84(359):78–79, Jan. **1958.** 5 refs. **DWB, DLC**— omments on the development of the UDC for Meteorology (C. E. P. BROOKS, 1936) and the cepted changes made by WMO. Commission for Bibliography and Publications in 1953 id approved by the F.I.D. (International Federation of Documentation) to be effective n. 1, 1957 and published with permission of the British Standards Institution. *Subject eadings:* **1. U.D.C. for meteorology. I. Brooks, C. E. P.**—*M.R.*

PRACTICAL AND APPLIED METEOROLOGY

MARINE METEOROLOGY AND OCEANOGRAPHY

See also: **Marine met. textbooks** (Coyecque), 9.7–8; **Marine disasters, Japan** (Onodera), 9.7–15; **Ice movement charts, N. Atlantic,** 9.7–25; **Columbia Univ. Lamont Geological Obs.** (Gray), 9.7–48; **Biography of Iu. M. Shokal'skiĭ** (Dobrovol'skiĭ), 9.7–55; **Weather ships, N. Atlantic,** 9.7–115; **Waterspout obs., Perlas Islands** (Grimes), 9.7–179; **Wind effects on lake levels, Finland** (Siren), 9.7–208; **Historic sea level data, Caspian Sea** (Kazancheev), 9.7–253.

9.7–61 551.515.1:551.461.2

Weenink, M. P. H., **De stormvloeden van 21–24 december 1954: een geval van resonantie.** [The storm surges of 21–24 December, 1954: a case of resonance.] *Netherlands. Meteorologisch Instituut, Wetenschappelijk Rapport W.R.*, 56-002 (IV-013), **1956.** 15 p. 8 figs. 41 eqs. **DWB**—Discussion based on the assumption of a forced sea level oscillation. Constants for this case are computed. The time interval between two storms produced almost complete resonance. A third storm would not have given a further amplification. Mathematical basis is outlined and illustrated by the actual sea level variations. *Subject Headings:* **1. Storm surges 2. Storms, North Sea (Dec. 21–24, 1954) 3. Resonance 4. Netherlands.**—*A.A.*

9.7–62 551.456:543

*Gololobov, IA. K., **O prichinakh mnogoletnikh izmeneniĭ gidrokhimicheskogo i gidrologicheskogo oblika verkhnego aktivnogo sloia Chernogo moria.** [The causes of secular changes in the hydrochemical and hydrological profile of the upper active layer of the Black Sea.] *Akademiia Nauk SSSR, Doklady*, 107(3):441–443, **1956.** tables, 4 refs. **DLC**—Over the period 1948–1953, hydrochemical observations were made during Aug. at levels from 0 to 300 m below the surface along a section extending from Batum to Yalta. Observations were made on salinity, acidity, amount of oxygen, phosphates and silicic acid dissolved in the sea water, and the results of the observations are given in tables. The data confirm that a relatively intensive deep nautical exchange of water between the oxygen and hydrogen sulfide zones exits in the Black Sea. Variations in wind conditions from year to year cause the differences in the intensity of this water exchange. *Subject Headings:* **1. Hydrochemical observations 2. Hydrochemical analysis 3. Black Sea.**—*I.L.D.*

9.7–63 551.46(02)

Epstein, Samuel and Williams, Beryl, **Real book about the sea.** illus. by Si Frankel. Edited by Helen Hoke. Garden City, N. Y., Garden City Books, **1954.** 223 p. **DLC**—In the 11 chapters of this popular science book, the legends of the sea, origin of sea tides, currents, waves, climatic effects, navigation, food resources and mineral resources of the sea are discussed in the light of the latest facts and theories. *Subject Headings:* **1. Oceanography 2. Popular science books.**—*M.R.*

9.7–64 551.46

Bogorov, V. G. and Dobrovol'skiĭ, A. D., **Okeanologicheskie issledovaniia v Kitaĭskoĭ Narodnoĭ Respublike.** [Oceanographic research in the Chinese People's Republic.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geog.*, No. 2:137–142, **1957.** 4 photos. **DWB**—Information on the state of oceanologic investigations in China are presented in a report by two members of a Soviet delegation which visited China in May–June 1956 for the working out of international cooperation in oceanological and limnological investigations in the Western Pacific. The delegation inspected marine biological, oceanological and limnological institutions and other special educational institutions. New marine museums, laboratories and institutions at Tsingtao are shown in photographs. *Subject Headings:* **1. Oceanographic research 2. China.**—*A.M.P.*

9.7–65 551.46(09) 551.510(09)

Revelle, Roger (*Scripps Institution of Oceanography, La Jolla, Cal.*), **On the history of the oceans.** *Journal of Marine Research*, New Haven, Conn., 14(4):446–461, **1955.** 2 figs.

tables, 23 refs. **DWB, DLC.** Reprinted as *California. Univ. Scripps Institution of Oceanography, La Jolla, Contributions*, 1955, issued July **1957.** p. 26–41. **DWB**—The author discusses the problems concerning the history of the oceans; namely, the volume of water on the earth's surface in the course of the earth's history, and former physical and chemical conditions in the water, and in the overlying atmosphere as compared with those prevailing today. The origin and history of the world ocean and of the earth's atmosphere are discussed in the light of astronomical evidence on bodies of water and the atmospheres of the various planets. The chemical and physical history of the earth's atmosphere as elaborated by HAROLD UREY, its relevance to the chemical properties of the world ocean, and evidence from fossils and living organisms on the properties of the oceanic waters are summarized. *Subject Headings:* **1. History of oceans 2. History of earth's atmosphere.**—*I.L.D.*

9.7–66 629.12:639.2

Walden, H., **Zur 25. Reise von "Anton Dohrn."** [On the 25th voyage of "Anton Dohrn."] *Wetterlotse*, No. 123:201–205, Oct. **1957.** 2 figs. **DLC**—When the fishery investigation ship "Anton Dohrn" returned to Cuxhaven on Sept. 7, 1957, her 25th journey was completed. These voyages included Iceland and Spitzbergen, fishery grounds of Barents Sea, Greenland coasts, Baffin Bay, etc. "Anton Dohrn" has its own weather service and takes regular observations of weather, wind and waves. Chart shows distribution by 1° squares of 2450 weather observations during first 24 journeys. *Subject Headings:* **1. "Anton Dohrn" 2. Fishery protection voyages.**—*C.E.P.B.*

9.7–67 639.2:591.5:551.46

Hempel, Gotthilf, **Fischbestand und Umwelt.** [Fish balance and surroundings.] *Umschau*, 57(22):673–675, 15 Nov. **1957.** 4 figs. **DLC**—In open seas, the horizontal and vertical distribution of temperature, salinity and ocean currents determine the distribution of fish species. This is exemplified by herring larvae in southern North Sea and by herring in Norwegian waters and cod in Iceland-Greenland region, which are determined by temperature. *Subject Headings:* **1. Herring fisheries 2. Cod fishing 3. Oceanography.**—*C.E.P.B.*

ICE (SEA, RIVER AND GLACIER)

See: **Glaciological obs., Pointe Géologie, Adélie Land** (Rivolier, Dyhamel), 9.7–39.

ASTRONAUTICS

See also: **IGY Satellite program, U. S.** (Kaplan), 9.7–36

9.7–68 551.507.362.2:551.506.2

Newell, Homer E., Jr. (*U. S. Naval Research Lab.*), **International Geophysical Year Earth Satellite Program.** *Scientific Monthly*, Wash., D. C., 83(1):13–21, July **1956.** 17 refs. **DWB, DLC**—The author sums up briefly the general program of the IGY and the significance of the satellite program within the overall program and then considers the physical properties of an artificial satellite, including the nature of its orbit and its relationship to the earth, the technical problems involved in the creation of an artificial satellite such as its launching into space, the uses of the satellite in meteorology, geodesy, etc., the instrumentation of the satellite and such satellite experiments as measurements of the earth, magnetic field above the E-region of the atmosphere, direct observation of the sun in the Lyman spectrum by means of photon counters, etc. *Subject Heading:* **1. IGY satellite program.**—*I.L.D.*

9.7–69 551.507.362.2:551.506.2

Carter, L. J., **The artificial satellite.** *British Interplanetary Society, Journal*, 14(6):297–99, Nov./Dec. **1955.** **DLC**—An editorial summarizing plans for the 12 satellites to be launched by the U. S. during IGY, and their possible orbits and ultimate value in weather forecasting, etc. *Subject Headings:* **1. Artificial satellites 2. IGY satellite program 3. Weather forecasting.**—*M.R.*

9.7–70 551.507.362.2:551.506.22

Kraft, Mike, **Stepping into space with a man-made satellite.** *Michigan Technic*, Ann Arbor, Mich., 74(7):30–31, April **1956.** fig., photo. **DLC**—Work of the Electrical Engineering Dept. of Michigan Univ. on the Rocket-Satellite program is stressed in this article on the IGY satellite program and launching plans. *Subject Heading:* **1. IGY satellite program.**—*M.R.*

9.7–71 551.501.9:551.507.362.2

Hagen, John P. (*Naval Research Lab.*), **Radio tracking, orbit and communication for the earth satellite.** *Aeronautical Engineering Review*, N. Y., 16(5):62–66, March **1957.** 3 figs. **DLC**—A chain of receiving stations, extending from Washington, D. C., to Santiago, Chile is being set up to create a radio fence which will intercept a satellite each time it circles the earth. This system was chosen to prove that a satellite is in orbit and to derive geophysical information from perturbations of that orbit. *Subject Headings:* **1. Satellite networks 2. Satellite orbits 3. Radio satellite tracking.**—*Author's abstract.*

9.7–72 551.507.362.2

White, E. C.; Foley, J. and Wilkins, R. G., **Power supplies and telemetry for an instrumented artificial satellite.** *British Interplanetary Society, Journal*, 15(4):177–191, July/Aug **1956.** 9 figs., 3 tables, 7 refs., eqs. **Pt. 1, Orbital considerations. Pt. 2, Instrumentation and telemetry. Pt. 3, Availability of power. DLC**—To stay in an orbit for 12 months or more, a satellite would have to have a circular rather than an elliptical orbit, since the changes in the earth's own orbit would require constant changes in the satellite's orbit if it were elliptical. Also the orbit should be so that it will be in the earth's shadow for a minimum percent of time; otherwise the solar powered battery would run down. Characteristics of solar power sources and batteries are worked out and discussed quantitatively. *Subject Headings:* **1. Satellite orbits 2. Satellite observatories 3. Solar power source for satellites.**—*M.R.*

AERONAUTICAL METEOROLOGY

See also: **Aeronaut. research conf.** (NATO), 9.7–4; **Ice fog, Alaska** (Mitchell), 9.7–146; **Airflow over mts. and pilot guides** (Corby), 9.7–212.

9.7–73 629.12:551.510.53:551.557.5:06

Viaut, A., **Conditions météorologiques aux hautes altitudes et assistance météorologique aux aéronefs à hautes performances.** [Meteorological conditions at high altitudes and meteorological assistance to high-speed aircraft.] *Ciel et Terre*, Brussels, 73(5/6):237–256, May/June **1957.** 8 figs., 5 photos. **DLC**—The structure of the atmosphere up to extreme altitudes, and atmospheric (surface, upper-air and high altitude) elements affecting the operation of jet aircraft are discussed in detail. The article is accompanied by diagrams exemplifying the type of data collected by aviation weather services. The illustrations include some interesting photographs of jet-stream clouds. Instrumental developments are also discussed, such as a visibility meter consisting of a searchlight directed toward a photoelectric cell, and the use of radar for tracking radiosondes and for cloud detection (in particular, the techniques used at Trappes near Paris). *Subject Headings:* **1. Aviation meteorological service 2. Jet stream clouds 3. Visibility meters 4. High altitude flying 5. Trappes, France.**—*G.T.*

9.7–74 551.578.1

Dorsch, Robert G.; Saper, Paul G. and Kadow, Charles F., **Impingement of water droplets on a sphere.** *U. S. National Advisory Committee for Aeronautics, Technical Note*, 3587, Nov. **1955.** 29 p. 7 figs., table, 10 refs. **DWB, DLC**—Droplet trajectories about a sphere in ideal fluid flow were calculated. From the calculated droplet trajectories, the droplet-impingement characteristics of the sphere were determined. Impingement data and equations for determining the collection efficiency, the area, and the distribution of impingement are presented in terms of dimensionless parameters. The range of flight and atmospheric conditions covered in the calculations was extended considerably beyond the range covered by previously reported calculations for the sphere. *Subject Headings:* **1. Drop impingement 2. Ice formation 3. Ice prevention and removal. I. NACA TN 3587.**—*Authors' abstract.*

9.7–75 533.6:629.13

Garrick, I. E. (*Chief, Dynamic Loads Div. NACA Langley Aeronautical Laboratory, Langley Field, Va.*), **Aerodynamic theory and its application to flutter.** Prepared for Structures and Materials Panel of Advisory Group for Aeronautical Research and Development. Wash., D. C., National Advisory Committee for Aeronautics, April **1956.** 26 p. 19 figs., 3 refs., eqs. **DWB**—A survey is given of the present status of aerodynamic theory in relation to flutter analysis with a discussion of concepts implied in the structural and aerodynamical background. Applications of some recent developments in the theory of oscillating wings, offering promise for the flutter analysis of low-aspect-ratio wings, are indicated. Problems of the subsonic and supersonic speed ranges are included. *Subject Headings:* **1. Aerodynamic theory 2. Aeronautical engineering.**—*Author's abstract.*

9.7–76 551.5:629.13

International Civil Aviation Organization and World Meteorological Organization, **Arrangements de travail entre l'Organisation de l'Aviation Civile Internationale et l'Organisation Météorologique Mondiale.** [Working Agreement between the International Civil Aviation Organization and the World Meteorological Organization.] **1954.** 11 p. Issued as *World Meteorological Organization, WMO* [*Publication*], No. 25 and as *International Civil Aviation Organization, Doc.* No. 7475.—A French version of the pamphlet setting forth the terms of reference of ICAO and WMO with respect to mutual responsibilities for furnishing meteorological and climatological information and reports, codes, broadcasts, etc. for international aviation. *Subject Headings:* **1. Meteorological service to aviation 2. Aeronautical meteorology.**—*M.R.*

9.7–77 629.13

Nicklas, J. P., **Feasibility study of a vortex tube acoustic true airspeed meter.** Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y., Contract AF 33(616)-2566, Final Report, Nov. 1, **1955.** 116 p. figs. (incl. photos), tables, foot-refs., eqs. Appendix: McAdams, H. T., **Statistical analysis of vortex resonator multiple-factor experiment,** p. 67–116. tables, eqs.—Detailed report on development and testing of a true airspeed meter based on the acoustic output of a vortex tube (Vortex whistle) which in turn depends on air temperature, among other factors. The temperature sensitivity can be compensated, as it is slight and depends on tube geometry. The altitude effect was also found to be significant. *Subject Headings:* **. Airspeed meters. I. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y.**—*M.R.*

AGRICULTURAL METEOROLOGY

See also: **Climatic effects on sugar beets, Belgium** (Sneyers), 9.7–259.

9.7–78 551.58:634.25

Mercier, R. G. and Chapman, L. J., **Peach climates in Ontario.** *Canadian Society of Agronomy, 2nd Annual Meeting, Univ. of Toronto, June 25–28, 1956, Proceedings, Sec. C,* . 37–38. **DA**—Data for 51 weather stations in southern Ontario were examined for the 30-yr eriod 1925–54. The frequency in 30 yrs. of daily occurrence of temperature below 0°F was stablished for each station. Frequency graphs were made for 28 of the 51 locations that were ound to be suitable for peach growing. The odds of having 23°–26°F in spring were calculated nd climatic maps for S. Ontario drawn. *Subject Headings:* **1. Peach climates 2. Agricultural limatology 3. Ontario.**—*M.R.*

9.7–79 551.586.632:551.508.79

Schnelle, F. and Breuer, W., **Meteorologische Messgeräte und Voraussetzungen für den chorfwarndienst.** [Meteorological instruments and requirements for a scab warning service.] *ermany. Deutscher Wetterdienst, Berichte,* 6(41), **1958.** 22 p. 17 figs., 3 tables, 19 refs. **WB, DLC**—Meteorological instruments and observations used in plant disease warning ervices are described. A new recording apparatus is presented, which indicates periods of etting of leaves of fruit trees; its operation, the records obtained, and their analysis are iscussed. The instrument has been installed at several stations for microclimatic studies.

The use of such instruments has contributed considerably toward the accuracy of plant disease warning services. *Subject Headings:* **1. Plant disease warning services 2. Micrometeorological instruments 3. Germany.**—*A.V.*

9.7–80 551.58:633.73

Suarez de Castro, Fernando and Rodriguez G., Alvaro, **Relación entre el crecimiento del cafeto y algunos factores climáticos.** [Relation between the growth of the coffee plant and some climatic factors.] *Federación Nacional de Cafeteros de Colombia, Bogotá, Boletín Técnico*, 2(16), **1956.** 13 p. 7 figs., 5 graphs, 9 refs. **DWB** (M86:631 S939re)—Data on precipitation, temperature, and coffee crop production and growth of trees for 1950–54 at Chinchiná, Calarca, Chinácota and Fredonia in Colombia, are analyzed and compared with results obtained by others in Belgian Congo, India, El Salvador, etc. Comparisons are made in numerous graphs and tables. No relation was found between annual rainfall and growth, but a direct relation was found between mean hourly temperature sums and maximum or minimum growth. Some relation exists between seasonal precipitation and growth or flowering factors. *Subject Headings:* **1. Rainfall effects on coffee 2. Temperature effects on coffee 3. Coffee plantations 4. Colombia.**—*M.R.*

9.7–81 551.524.36(493)

*Vandenplas, A., **La vague de froid de février 1956 et les dégâts aux cultures.** [Cold wave of Feb. 1956 and the damage to crops.] *Belgium. Institut Royal Météorologique, Contributions*, No. 31, **1957.** 11 p. 7 tables. Also in: *Ciel et Terre*, Brussels, 72(11/12):665–675, Nov./Dec. **1956. DWB**—Feb. 1956 in Belgium had the longest period of severe cold in this century and was one of the coldest Februaries since 1833. Temperature and precipitation conditions of the month are discussed and compared with those of other severe Februaries. In an earlier statistical study, criteria for damaging freezing weather have been determined (3 consecutive days of severe frost [min. temp. below −13°C] within a longer period of intense frost [below −5°C], snow cover less than 5 cm, etc.). A table shows that such damaging frost situations occurred twice during Feb. 1956. *Subject Headings:* **1. Extreme temperatures 2. Cold waves 3. Frost damage to crops 4. Belgium.**—*G.T.*

9.7–82 551.524.632 551.584.43 551.586:632

Vandenplas, A., **Le gel des froments d'hiver.** [Frost damage to winter crops.] *Revue de l'Agriculture*, Brussels, 9(2):181–196, Feb. **1956.** 4 tables, 5 refs. Also his: **La vague de froid de février 1956 et les emblavures des froments d'hiver.** [The cold wave of Feb. 1956 and the fields with winter crops.] *Ibid.*, 9(3):3–8, March **1956. DA**—The first paper is a study of the influence of atmospheric conditions on the freezing of winter crops; namely, that of atmospheric temperature, soil temperature, atmospheric humidity, wind (direction and force), insolation and snow cover thickness. Three successive days of very hard frost (min. temp. <-13°C) included in a period of hard frost (min. temp. from -5 to -10°C) when the snow cover thickness is <5 cm will cause considerable damage to winter crops. The second paper is a study of the effect of weather conditions, during the exceptionally cold month of Feb. 1956, upon the damage to winter crops. During this cold period the ground was covered with a thin layer of ice, which did not stick to the soil but was separated from it by a thin lining of air which formed an ideal insulation and in many places protected the cultures which otherwise would have been destroyed by the intense cold. *Subject Headings:* **1. Field microclimatology 2. Frost damage to crops 3. Severe winters 4. Belgium.**—*A.V.*

9.7–83 535.2:577.1

Bormann, F. H. (*Dartmouth College, Hanover, N. H.*), **Percentage light readings, their intensity-duration aspects, and their significance in estimating photosynthesis.** *Ecology*, Durham, N. C., 37(3):473–476, July **1956.** 3 figs. (incl. photo), table, 5 refs. **DWB, DLC**—The intensity duration of light during the growing season and the quantitative effect of shading on light distribution was investigated from May to Oct. 1954 for unshaded and shaded conditions. It was found that the percent of full light reading in terms of intensity did not typify the most commonly received intensities, most of the light received on shaded and unshaded plots was below the midpoint of the range of intensity of the plot, shading reduced the light

ntensity received but increased the proportion of light accumulated in lower intensity classes nd that percent of full light measurements do not constitute a substantial basis for the explanation of photosynthetic reactions of plants. *Subject Headings:* **1. Photosynthesis 2. Light ntensity.**—*I.L.D.*

9.7–84 551.5:63 551.58:63

Miller, A. Austin (*Prof. of Geog., Univ. of Reading*), **Climate, weather and crops.** *Ceylon Geographical Society, Colombo, Bulletin*, 8(3/4):57–63, July/Dec. **1954.** 2 tables. **DWB, DLC**—The author distinguishes between the influence of weather and climate upon crops and presents a detailed instance of the effect of each. A description is given of the effect of a killing frost in late April or May upon an apple crop and the temperature needs for the development and ripening of crops. Data are given on the temperature causing injury at various developmental stages of apples, meteorological variables associated with the disastrous frost of May 1944 at Reading, Eng.; monthly temperature sums required for the development of citrus fruits at various citrus raising areas in Europe and North America, etc. *Subject Headings:* **1. Agricultural meteorology 2. Agricultural climatology.**—*I.L.D.*

9.7–85 551.584.61:551.524:631

*LaRock, Max J. and Yeck, Robert G., **Bank barns compared with above ground barns for housing dairy cattle.** *U. S. Dept. of Agriculture, Production Research Report*, No. 2, Oct. **1956.** 38 p. 14 figs. (incl. photos), 9 tables, 7 refs. **DA**—A bulletin containing practical information on the temperature, humidity, light intensity and odors in bank barns and normal barns, and a statistical comparison of the quality of milk produced in the two types of barns. Micrometeorological tests were made in 26 two-story barns in Wisconsin and production tests in 202 barns. Layout of instruments is shown in a floor plan and specifications given in tables. Besides variations in temperature and humidity of air, the temperature of walls, ceilings, floors and earth temperatures were measured. Sample hygrothermograph records are reproduced for various types of ventilating systems. Effect of turning cows out to pasture is shown dramatically on the records. Conclusion is that there is little difference in summer temperatures between the two types of barns but that bank barns have a more even temperature in winter. Ends of barns are significantly colder than centers but no difference was observed in milk quality or production of cows in one part from those in another part of the barn, or between the two types of barns. The earth bank is a source of heat at temperatures below 50°F, and when temperatures fall rapidly in winter condensation seldom occurred on banked walls during cold weather but did occur once or twice a year when temp. and dew point rose rapidly. Condensation occurred frequently on exposed walls in both types of barns in freezing weather, but did not affect lacterial count of milk. Light intensity was less uniform and lower in bank barns than in normal barns, but along central alley no difference was noted for summer and winter conditions. *Subject Headings:* **1. Barn climates 2. Barn temperatures 3. Milk production.**—*M.R.*

9.7–86 551.579.5:551.573:631.67

Van Bavel, C. H. M., **Estimating soil moisture conditions and time for irrigation with the evapotranspiration method.** *U. S. Dept. of Agriculture, Agricultural Research Service, ARS* 41-11, Aug. **1956.** 16 p. tables, eqs. **DWB** (M79.5 V218e)—A method is described whereby the need for irrigation is determined from an initial state of maximum soil moisture, modified daily by the amount of precipitation and evapotranspiration. A nomogram is presented for computing evapotranspiration from extraterrestrial radiation (constant for month and latitude), sunshine duration and air temperature. *Subject Headings:* **1. Soil moisture determinations 2. Evapotranspiration 3. Irrigation requirements.**—*G.T.*

FOREST METEOROLOGY

9.7–87 551.584.41

Keen, F. P. (*Calif. Forest and Range Experiment Station, Forest Service, U. S. Dept. of Agriculture*), **Low temperature differentials in one forest drainage.** *Ecology*, Durham, N. C., 37(2):381–383, April **1956.** fig., 3 tables, 6 refs. **DWB, DLC**—A study of the distribution

and variability was carried out in a ponderosa pine forest in the Ochoco Creek Drainage of the Ochoco National Forest in Oregon. Data on minimum temperature on a given day and on temperature differences by location are presented. It was shown that "during the cold periods studied, high elevations were up to 10 degrees warmer than low elevations, slopes were up to 7 degrees warmer than valleys, and at 70 ft up the tree trunk was 2 degrees warmer than at the 10 ft level." *Subject Headings:* **1. Forest temperature differences 2. Tree temperatures 3. Ponderosa pine 4. Ochoco National Forest, Oregon.**—*I.L.D.*

DENDROCHRONOLOGY

9.7–88 529:634.94(09)

Studhalter, R. A. (*Texas Tech. Coll., Lubbock, Texas*), **Early history of crossdating.** *Tree-Ring Bulletin*, Tucson, Arizona, 21(1/4):31–35, April **1956. DWB**—An historical outline of increasing interest in tree rings and corresponding methods involving estimates of age, internal markers, legal aspects, etc. TWINING (1833) was the first to realize the climatological significance of tree rings. Coordinating of different trees started as early as 1737. A more complete paper on the subject was published by the author in *Botanical Review*, 21:1–72, **1955.** *Subject Headings:* **1. Tree rings 2. History of dendrochronology.**—*A.A.*

9.7–89 551.583:526:634.94

Holmsgaard, Erik, **Årringesanalyser af Danske Skovtraeer.** [Tree-ring analyses of Danish forest trees.] (*Det*) *Forstlige Forsøgsvaesen i Danmark*, 22(1):246, **1955.**—Excerpts in English from author's summary in *Tree-Ring Bulletin*, Tucson, Arizona, 21(1/4):25–27, April **1956.** 13 refs. **DWB**—Tree-ring widths in Denmark do not depend much on weather conditions since neither temp. nor precip. is critical. Some weak relations are outlined, suspecting also an effect of wind. *Subject Headings:* **1. Dendroclimatology 2. Denmark.**—*A.A.*

9.7–90 634.94:523.74/5:551.590:21

Vercelli, F., **Dendrologie.** [Dendrology.] *Scientia*, Bologna, Como, 85:16–20, Jan. **1950.** ref. Stamped on cover title: *Istituto Talassografico, Trieste, Pubblicazioni*, No. 258. Abstracted from reprint. **DLC**—A short general review on the investigations of tree-ring in connection with solar and climatic phenomena. Several remarks about Italian contributions are made. No data are included. *Subject Headings:* **1. Dendrochronology 2. Solar phenomena 3. Meteorology.**—*A.A.*

9.7–91 551.583:526:634.94

†Hoeg, Ove Arbo (*Oslo Univ., Blindern, Oslo, Norway*), **Growth-ring research in Norway.** *Tree-Ring Bulletin*, Tucson, Arizona, 21(1/4):2–15, April **1956.** 2 tables, 35 refs., eqs. **DWB**—Although dendrochronology started in Norway as recently as 1926, a considerable amount of research has been done since then, with primary attention on mathematical criteria. Summer temp. is the main influencing climatic factor. *Subject Headings:* **1. Dendrochronology 2. Norway.**—*A.A.*

INDUSTRIAL AND MEDICAL METEOROLOGY

See also: **Indoor air movement** (Shakhbazian), 9.7–92; **Coagulation of blood** (Piccardi, Danti), 9.7–256; **Skin temp. and skin radiation absorption** (Reuter), 9.7–258.

9.7–92 551.584.61:551.510.42

Shakhbazian, G. Kh, **Materialy k gigienicheskomu normirovaniiu dvizheniia vozdukha v proizvodstvennykh pomeshcheniiakh.** [Materials for the hygienic standardization of air movement in factories.] *Gigiena i Sanitariia*, Moscow, 21(5):7–12, May **1956.** 3 tables, 8 refs. **DLC**—The author presents the results of experiments to determine what combinations of air temperature and air movement are best suitable for establishing comfortable and healthful air movement rates in shops. The results of experiments on air temperature from 0° to 30°C and air movement from 0.25 to 3 m/sec, and the accompanying physiological responses of the body, such as body and skin temperatures, pulse rate, etc. are given in tables. *Subject Headings:* **1. Indoor air 2. Physiological effects of air movement.**—*I.L.D.*

9.7–93 551.586:61

†*Breuer, Lothar J., **Zur Meteoro- und Heliotropie der Eklampsie.** [Meteorotropy and eliotropy of eclampsia.] *Cologne. Universität. Meteorologisches Institut, Publication*, No. 2, 955. 84 p. 28 figs., 22 tables, 77 refs.—A dependency of eclampsia (a kidney complication uring pregnancy) on weather phenomena and geomagnetic activity was long suspected and is itically studied in this dissertation. A total of 958 cases were used. The results do not ow any relation which could be proved statistically, including daily and annual variations. Iathematical criteria involved are discussed. *Subject Headings:* **1. Medical meteorology Eclampsia 3. Germany 4. Scotland.**—*A.A.*

9.7–94 551.584.9:646

†Woodcock, Alan H.; Pratt, Richard L. and Fonseca, George F. **A comparison of experiental pile clothing with the standard Army Arctic uniform of 1953.** *U. S. Quartermaster orps. Research and Development Command. Environmental Protection Center, Technical Report* P-13, Aug. **1955.** 29 p. 10 figs. (incl. photos), 4 tables, 19 refs. **DWB**—Using the principles of design of the experimental pile clothing based upon the knowledge of heat transfer rough functional clothing, the authors carried out laboratory and field studies to predict ie performance characteristics of experimental pile clothing and the principles of design. ile assemblies of experimental tone and light pile and the standard Arctic uniform were compared in the cold chamber and in the field at Fort Churchill, Canada under conditions of rest nd exercise. Their ventilation properties and their effectiveness in preventing after exercise hill was determined. The results are presented and analyzed. *Subject Headings:* **1. Clothing limate 2. Arctic.**—*I.L.D.*

9.7–95 551.586:551.515.8:591.1

Häfelin, J. and Lotmar, R., **Ein Beitrag zur Frage der biotropen Wirkung atmosphärischer ronten.** [Contribution to the problem of the biotropic influence of the atmospheric fronts.] *chweizerische Naturforschende Gesellschaft, Verhandlungen*, 135:114–115, **1955. DWB**—The roblem of biotropic effect of the passage of fronts was made more clear by experiments of ercentage absorption in rabbits of radioactive sodium sulfate $NaS^{35}O^4$ and by daily analyses f radioactivity of the animals' urine. After a strong separation of non-utilized sulfate in the rst days after the introduction, it tapered down until the 110th day, but increased suddenly n certain days in all, or the majority, of the animals. A calendar of cold fronts, showed that he increase in the non-utilized sulfate separation occurred on 12 days, distinguished by the assage of biotropic cold fronts peculiar to the transition from old to fresh Polar air. *Subject leadings:* **1. Frontal passage effects 2. Weather effects on sulfur metabolism 3. Rabbits.** *-A.M.P.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Ice movement charts, N. Atlantic,** 9.7–25; **Cosmic physics laboratories,** 9.7–42; **Actinometric networks, Italy** (De Pasquale), 9.7–43; **Synoptic forecasting, France** (Clausse), 9.7–45; **Satellite networks and orbits** (Hagen), 9.7—71; **Weather ship networks,** 9.7–115; **Aerological cross sections and mean circulation diagrams** (Vuorela), 9.7–161; **Hurricane structure** (Osmun), 9.7–173; **Extreme values theory and nomograms** (Weiss), 9.7–230; **Raindrop size distribution** (Wexler), 9.7–234; **Radio echoes from meteors and shower obs.** (Hines), 9.7–263; **Radio echoes from meteors trails** (Hines); 9.7–264; **Radio echoes from meteors,** (Vogan, Campbell), 9.7–265.

9.7–96 551.501.4:061

Landsberg, Helmut E., **Preparing climatic data for the user.** *World Meteorological rganization. Commission for Climatology, 2nd Meeting, Wash., D. C., Jan. 1957, Papers, Cl*-II/SP. 4, Jan. 23, **1957.** 5 p. 7 refs. **DWB** (M06W927cm CCl:1957)—Operations of the . S. Weather Bureau's National Weather Records Center in Asheville, N. C., are discussed. he machine methods used at the Center for data recording (on punched cards), checking,

listing for publication, and special analysis, are described. Analyses prepared in the past include annual summaries for primary and for cooperative stations, climatographic tabulations for major population centers, determinations of atmospheric refractive index frequencies, of radioactive fallout probabilities, of extreme wind speed probabilities, etc. Marine climatological data and weather data for farmers are published continuously. The author advocates an increased research effort aimed at the prediction of trends, a hitherto largely unexplored area. *Subject Headings:* **1. National Weather Records Center 2. Climatic data presentation 3. Climatic trend forecasting.**—*G.T.*

9.7–97 551.501.45

Essenwanger, O., **Tafeln zur Häufigkeitszerlegung mit Anwendungsbeispielen.** [Tables for frequency analysis with examples of applications.] *Germany. Deutscher Wetterdienst, Berichte*, 5(39), **1957.** 13 p. 2 figs., 14 tables, 18 refs., 33 eqs. **DWB, DLC**—The author recapitulates the theoretical equations developed for analyzing frequency distributions by means of the usual curves. For practical applicability the results of the equations were reduced to tabular form. In order to explain the use of the tables the author deals with practical examples and calls attention to the different peculiarities which may present themselves in meteorological frequency distributions. *Subject Headings:* **1. Frequency distributions 2. Statistical methods in meteorology 3. Computation tables.**—*A.V.*

9.7–98 551.501.6:551.521.11

Collmann, Wolfgang, **Diagramme zum Strahlungsklima Europas.** [Diagrams of the radiation climate of Europe.] *Germany. Deutscher Wetterdienst, Berichte*, 6(42), **1958** 8 p. 3 tables, 20 diagrs., 6 refs. **DWB, DLC**—The tables and diagrams of this publication are intended to furnish data on solar radiation for purposes of agriculture, wine growing, the building industry, air conditioning, etc. *Subject Headings:* **1. Radiation data 2. Radiation diagrams 3. Europe.**—*A.V.*

9.7–99 551.501.4:551.511.33

Fea, Giorgio, **Adiabatiche reversibili per aria satura.** [Reversible adiabatics for saturated air.] *Rivista di Meteorologia Aeronautica*, Rome, 16(2):15–20, April/June **1956.** 2 figs., table, eqs. French, English and German summaries p. 15. **DLC**—A graphical method for solving the equation of reversible adiabatics for saturated air is proposed; the method is applicable to the actual tracing of adiabatics on thermodynamic diagrams. *Subject Heading* **1. Reversible adiabatics.**—*Author's abstract.*

9.7–100 551.501.8:551.594.5

Fricker, S. J.; Ingalls, R. P.; Stone, M. L. and Wang, S. C., (*all, Lincoln Lab., M.I.T.*) **UHF radar observations of aurora.** *Journal of Geophysical Research*, Wash., D. C., 62(4):527–546, Dec. **1957.** 14 figs., 2 tables, 6 refs. **DLC**—Radar returns from aurora have been observed on a 412.85-Mc/s pulsed bistatic radar, located at South Dartmouth, Mass. Results obtained during two observational periods, 19 Sept. to 6 Oct. 1956, and 29 Nov. to 21 Dec. 1956, are given in terms of occurrence and position data, together with typical returns obtained on A-scope and range-time intensity modulated displays. Positions of observed returns are compared with positions computed on the basis of requiring beam perpendicularly to the earth's magnetic field. Indications are that returns may be obtained from regions which are 2° to 3° off perpendicular, and that returns at larger off-perpendicular angles may be limited by a height factor. The returns appear to be limited to the height range of 90 to 160 km approximately. *Subject Headings:* **1. Radar observation of auroras 2. UHF radar observation 3. South Dartmouth, Mass.**—*Authors' abstract.*

9.7–101 551.501.81:551.515:7

§†Leach, Wayne, **Convective cell bands in the central and eastern United States as observed by radar.** Texas. Agricultural and Mechanical College. Dept. of Oceanography and Met. Contract AF 19(604)-1564, Scientific Report No. 2, April **1957.** 47 p. 22 figs. (incl. photos.) 26 refs., 4 eqs. "Master's thesis."—Analysis of time-lapse radarscope films reveals that certain types of line storms have a distinctive and characteristic meso- and microstructure

eatures of such storms which are identified and studied are: (1) the "thin band"; (2) the ell band"; and (3) the "trail band." In detailed case studies it is found that the thin band a radar echo apparently produced by a region of strong dielectric gradients; the cell band is oduced by hydrometeors in active convective cells; and the trail band is a precipitation ea from an older storm or is generated in some manner by the juxtaposition of the line storm id a "bubble" high pressure area. It is further found that pressure jumps, wind shifts, and ight temperature changes are observed coincident with passage of the thin band over a rface reporting station. Also, that movement of the thin band through an isolated pre- pitation echo appears to result in intensification of the latter. The theory of dielectric attering and some observations of extreme dielectric gradients are examined. It is found at while very large gradients have occasionally been observed, theory indicates even larger es must exist to explain the echo of the thin band on this basis. It is noted that weather nditions which attend these storms may, on occasion, be so extreme that further studies nploying more comprehensive observations are very clearly warranted. *Subject Headings:* **Radar scope photography 2. Radar storm detection 3. Radar rain observations 4. Con- ective cells.**—*Author's abstract.*

9.7–102 551.501.81:551.594.5

McNamara, A. G., **A continuously recording automatic auroral radar.** *Canadian Journal Physics*, Ottawa, 36(1):1–8, Jan. **1958.** 6 figs., 6 refs. **DWB, DLC**—A simple, low-power Mc./s. radar is described which has been designed for automatic recording of radio reflections om auroral ionization. The system features high sensitivity with good reliability. Photo- aphic records are taken in the form of a continuous film strip displaying range and time. complementary recording system employs circuitry which cancels interference and noise gnals but produces an output signal proportional to the integrated echo intensity. The splay in this latter case is in the form of a chart record from which data are immediately ailable. *Subject Headings:* **1. Radar echoes from auroras 2. Auroral recorders.**—*Author's stract.*

9.7–103 551.501.81:551.515.23

Rockney, Vaughn D. (*U. S. Weather Bureau*), **Hurricane detection by radar and other eans.** (In: Tropical Cyclone Symposium, Brisbane, Dec. 1956, **Proceedings.** Pub. Dec. **56.** p. 179–197. 9 figs., table, 24 refs.) **DWB**—The history of the use of electronic ethods or the detection and tracking of tropical storms is reviewed. The structure of the ecipitation patterns associated with various hurricanes is discussed and a "composite" ttern for several storms in the vicinity of 35°N is developed. The author believes that the aximum range of hurricane "eye" detection by land-based radar is about 175 nautical miles, th the average being about 150 nautical miles. Exceptions to the average are cited. Rec- mmendations are made as to technical specifications for an optimum radar for hurricane tection. Possible radar procedures for measuring the rainfall associated with hurricanes d other severe storms are outlined. It has been found that locating the "eye" of a hurricane sferics methods is not possible because thunderstorm activity is not associated with the ye" but rather with the unstable outer radar bands. Brief mention is made of the current ate of microseismic research in the U. S. Additional instrumentation under development, ch as rocket photography and hurricane beacons, is mentioned briefly. *Subject Headings:* **Radar hurricane tracking 2. Radar observation of hurricanes 3. Eye of hurricane.**— *uthor's abstract.*

9.7–104 551.501.81:551.590

Rumi, G. C. (*Geophysical Inst., College, Alaska*), **VHF radar echoes associated with nospheric phenomena.** *Journal of Geophysical Research*, Wash., D. C., 62(4):547–564, ec. **1957.** 3 figs., (11 photos), 34 refs., 3 eqs. **DLC**—VHF radar observations during the mmer and the fall of 1955 at Ithaca, N. Y., gave useful information not only about lightning, eteors, and aurora, but also about the possible existence and characteristics of "upward scharges" from the top of the troposphere to the bottom of the ionosphere. A radar operated 27.85 Mc/sec was used. A feature was the photographing from magnetic tape records at were played back to reproduce the original oscilloscope presentation. This technique

proved to be useful in permitting more detailed analysis than had previously been possible. Photographs are presented that show examples of echoes (in an amplitude-vs-time display) that we have attempted to associate with "upward discharges." (Photographs of a simple meteor echo and of a meteor echo embedded in an auroral echo are also included.) Detailed analysis led us to dissociate many of our echoes from meteors. Their rise and decay speeds, their duration, their flatness, their ranges of appearance, and the observed repetitions suggested that "upward discharges" from troposphere to ionosphere could have been responsible for the reflection of radio waves. Nevertheless, meteors cannot be ruled out of a complete picture of the phenomenon. Meteors may play a role in the generation of "upward discharges" as a triggering agent. *Subject Headings:* **1. Upward discharges 2. Radar photographs.**—*Author's abstract.*

9.7–105 551.501.83:551.515.2

Horner, F., **Measurements of atmospheric noise at high frequencies during the years 1945–1951.** *Great Britain. Dept. of Scientific and Industrial Research, Radio Research Special Report*, No. 26, **1953.** 40 p. numerous figs., 8 tables. **DWB**—Results of measurements at 20 noise measuring stations in all parts of the world are analyzed for period 1945–51. Year to year, seasonal and diurnal variations as well as geographical differences are revealed in graphs and text. Various frequencies (2.5, 5, 10, 15 and 20 mc/s) are considered. Changes in methods of prediction for 2.5 and 5 mc/s are indicated as a result of this survey. No change in 15 and 25 mc range seems necessary. This is thought to be due to the fact that higher frequency noise comes from distant thunderstorms and lower frequencies from more critical local thunderstorm areas. *Subject Headings:* **1. Sferics from thunderstorms 2. High frequency radio noise.**—*M.R.*

9.7–106 551.501.83:551.508.8

Horner, F. and Harwood, J., **An investigation of atmospheric radio noise at very low frequencies.** *Institution of Electrical Engineers, Proceedings, Pt. B*, 103(12):743–751, Nov. **1956.** 11 figs., 8 refs., 9 eqs. **DLC**—Technical aspects of noise measurement for long wave reception; nature of noise; average probability and amplitude distribution of voltage peaks; time distribution of peaks; measuring equipment; pen records, diurnal and seasonal variations in field strength, noise structure, amplitude probability, distribution of envelope and time distribution of major impulses are analyzed and discussed. Examples are cited and illustrated by records and curves for varying situations of thunderstorm incidence during July–Sept., 1956 in southern England (Radio Research Station). *Subject Headings:* **1. Radio noise 2. Sferic recording.**—*M.R.*

9.7–107 551.501.83:551.508.8

McKerrow, C. A. (*Defence Research Board, Ottawa*), **Some recent measurements of atmospheric noise in Canada.** *Institute of Radio Engineers, N. Y., Proceedings*, 45(6):782–786 June **1957.** 5 figs., 2 tables, 6 foot-refs. **DLC**—Some recent atmospheric noise measurements in the vlf range have been made in Canada by the Defence Research Telecommunication Establishment of the Defence Research Board. The amplitude of the mean logarithmic power (mlp) of atmospheric noise on a frequency of 10 kilocycles has been measured at Ottawa, Ontario (lat. 45.4°N, long. 75.9°W), over a period of one year, beginning in Oct. 1955. The mlp atmospheric noise amplitude has also been measured in the sub-Arctic regions of Canada at Churchill, Manitoba (lat. 58.8°N, long. 94.2°W), on a frequency of 107 kc for the period Dec. 1955 to August 1956. A brief description of the equipment used to obtain these measurements is described. The results of the measurements are presented in the form of a graphical analysis showing the hourly median variations. These measurements are compared with previous measurements made in Canada, and with the estimated values of the National Bureau of Standards, and CCIR predictions of July 1956. *Subject Headings:* **1. Sferics measurement 2. Sferics recorders 3. Canada.**—*Author's abstract.*

9.7–108 551.501.83:551.515:551.508.4

Skeib, Günter, **Die Peilung atmosphärischer Störungen durch Synchronaufnahme von Richtung und Wellenform.** [Determination of atmospheric disturbances by synchron

cording of direction and wave-forms.] *Germany. Deutscher Wetterdienst, Berichte*, No. 22):146-147, **1956.** 9 refs. **DWB, DLC**—The author discusses the detection of atmospheric sturbances by means of the synchronous recording of direction and wave forms with particular ference to the work of F. SCHINDELHAUER, on the use of small sector sounding and cathode y sounding, the Potsdam synchronous recording apparatus, the automatic atmospheric ave form recorder (ADCOCK and CLARKE), etc. *Subject Headings:* **1. Atmospheric disturbces 2. Atmospheric wave recorders 3. Storm detection.**—*I.L.D.*

9.7–109 551.501.83:551.508.94

Takagi, Masumi and Isikawa, Haruzi, **The waveform recorder of atmospherics radiated m short distance origin.** *Nagoya. Univ. Research Institute of Atmospherics, Proceedings*, 48–59, Dec. **1956.** 11 figs., 3 refs. **DWB**—An apparatus has been designed to record the aveforms of atmospherics, the sources of which are distributed roughly within the range 100 km from the observing station. The apparatus is capable of recording the waveform an atmospheric simultaneously in three ways. These give the 2 m-sec single time sweep aveform representing fine structures, the 20 m-sec single sweep waveform showing general atures, each of which is photographed on the respective frame of 35 mm film, and the wave rm representing the whole structure of field variation and being recorded on 16 mm cine n running continuously. Another recorder, registering the highest peak voltage appearing the duration of the individual atmospheric, is attached to the apparatus to monitor the eration of the apparatus. In the present paper the construction and the performance of the paratus are described in detail. *Subject Heading:* **1. Sferics wave form recorders.**—*Authors' stract.*

9.7–110 551.501.83:551.508.86

Watt, A. D. and Maxwell, E. L. (*both, Nat. Bureau of Standards, Boulder, Colo.*), **Characterics of atmospheric noise from 1 to 100 KC.** *Institute of Radio Engineers, N. Y., Proceedings*, (6):787–794, June **1957.** 18 figs., 10 foot-refs., 3 eqs. **DLC**—The results of some preliminy statistical measurements of the envelope of narrow band atmospheric noise are presented a range of center frequencies from 1 to 100 kc. The variation of level and dynamic range, a function of frequency, is examined and compared with results expected on the basis of htning discharge spectra, thunderstorm distribution, and propagation phenomena. *Subject ading:* **1. Sferics measurements.**—*Authors' abstract.*

OBSERVATIONAL DATA

See also: **N. Atlantic and Netherlands weatherships,** 9.7–19; **Upper air wind data, Netherlands,** 9.7–21; **Netherlands lightships,** 9.7–22; **IGY ionospheric sounding program, Western Hemisphere** (Orsini), 9.7–33; **IGY satellite program** (Kaplan), 9.7–36; **Annual precipitation bulletins, Israel,** 9.7–224.

9.7–111 551.506:551.521.11(481)

*Norske Videnskaps-Akademi i Oslo. Biologiske Statsjon, Sörnesset, **Globalstraling: tiden og dognets soltidsfordeling, Nov.–Dec. 1955.** [Global radiation: time of sunshine d its diurnal distribution, Nov.–Dec. 1955.] Its *Publication*, 2(7–8), **1955.** 2 pieces. out 5 p. each. Also **March–April 1957.** *Ibid.*, 4(3/4), issued **1957.** 10 p. Mostly tables. **VB** (M21.1 N863g)—Data on insolation at the biological station Sörnesset, Sollia, are ulated for periods covered. They include hourly sunshine duration (in minutes) for every y of the month, and hourly amounts of global radiation in cal/min cm². *Subject Headings:* **Global radiation data 2. Sunshine duration data 3. Sollia, Norway.**—*G.T.*

9.7–112 551.506.7:551.557:551.507.3

Mastenbrook, H. J., **Transosonde flights for 1955, data report.** *U. S. Naval Research boratory, NRL Memorandum Report*, No. 612, June **1956.** Also his: **Transosonde flights for uary and February 1956, data report.** *Ibid.*, No. 532, Sept. **1956.** 25 p. 3 figs., table, flight tables, 2 refs. Also his: **Transosonde flights for June and July, 1956, data report.** *d.*, No. 628, Aug. 1956. 14 p. 7 flight tables, 2 refs. **DWB**—In the first paper detailed

data are presented for 4 transosonde (constant level) balloons launched from the Naval A Station at Vernalis, Calif., on May 4, May 12, May 26 and June 2, 1955. The balloons wer 39-foot polyethylene. Fixes were obtained every 2 hrs. Cameras (35 mm) were used fo more precise positioning-photographs being taken every 2 min. Pressure-height data ar provided at frequent intervals and camera and direction finder position data where availabl Pressures usually ranged from 270–300 mb. The second article is a compilation of data fro 16 out of 20 transosonde balloons released at Oppama, Japan in Jan. and Feb. 1956. A cha shows trajectory of each flight. About ⅓ crossed the U. S. after crossing the N. Pacific, an 2 crossed the Atlantic, nearly reaching Europe. Equipment is described and illustrated. Th third article is a compilation of flight meteorological data for 7 out of 9 transosonde balloo launched at Fallon, Nev., in June and July 1956. *Subject Headings:* **1. Transosonde da 2. Constant level balloon data 3. Oppama, Japan.**—*M.R.*

9.7–113 551.506.7:551.594.12/3:551.507.35

Sagalyn, Rita Callahan and Faucher, Gerard A. (*both, Air Force Cambridge Researc Center*), **Aircraft investigation of the large-ion content and conductivity of the atmospher** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 42:27–4 Nov. **1955.** 10 figs., table, 13 refs., 4 eqs. **DLC**—Recent simultaneous measurements electrical conductivity, large-ion concentrations, temperature, and humidity in the altitud range 700 to 15,000 ft by means of aircraft are described. The results of forty flights sho that over continental areas in fair weather there exists a layer adjacent to the ground varyin in depth from 1000 to 10,000 ft in which the vertical distributions of charged nuclei and ele trical conductivity are controlled primarily by atmospheric turbulence. At the upper boun ary of this layer there is observed a sharp decrease in temperature gradient, and in a transitio region approximately 800 ft in depth, the conductivity is found to increase by a factor of 1 to 6.0; the large-ion content to decrease by a factor of 1.5 to 100. Above this transition regi the large-ion content is reduced to very low values and the electrical conductivity increas with altitude in the same manner as determined from earlier experiments. Analysis sho that the surface layer can be identified with the friction layer familiar to meteorologists. Th role of atmospheric turbulence and the effect of these results on our understanding of t columnar resistance of the atmosphere are discussed. *Subject Headings:* **1. Electrical co ductivity of air 2. Large ions 3. Airplane observations.**—*Authors' abstract.*

9.7–114 551.506.8(49

*Lardinois, E., **Observations phénologiques à Uccle au cours de l'année 1955.** [Phen logical observations at Uccle during 1955.] *Ciel et Terre*, Brussels, 72(7/8):441–444, July/Au **1956. DWB**—The tables presented (with comments) are the following: dates of 48 phen logical events in 1955, along with the normal dates (1896–1940), monthly normals of te perature, insolation, precipitation and relative humidity at Uccle (1901–1930), month averages of these elements for Dec. 1954–Nov. 1955, and flowering dates for six plants at places in Belgium. *Subject Headings:* **1. Phenological observations 2. Uccle, Belgium.**—*G.*

INSTRUMENT CARRIERS

See also: **North Atlantic and Netherlands weatherships,** 9.7–19; **IGY satellite program** (Pickering), 9.7–34; **IGY satellite program** (Kaplan), 9.7–36; **IGY satellite program** (Newell), 9.7–68; **Artificial satellites** (Carter), 9.7–69; **Man-made satellites** (Kraft), 9.7–70; **Satellite networks and orbits** (Hagen), 9.7–71; **Satellite orbits and observatories** (White, et al.), 9.7–72; **Transosonde data, Oppama, Japan** (Mastenbrook), 9.7–112; **Electrical conductivity of air** (Sagalyn, Faucher), 9.7–113; **Air sampling instruments** (Chagnon), 9.7–142; **Upper atmosphere research and rocket obs. techniques,** 9.7–151; **Cold front structure and mesomet. networks, South Australia** (Berson), 9.7–184; **Icing of radiosonde balloons** (Kitaoka), 9.7–221.

9.7–115 551.507.22:551.50

The weather ships go on. *Interavia*, Geneva, 9(4):232, **1954.** illus. **DWB**—Deta of agreement effective July 1, 1954 whereby 13 stations (1946) and 10 stations (1949) w further reduced to 9; requiring 21 instead of 25 ships, the U. S. supplying 11 ships for 4 statio

ıer savings than the basic $3,800,000 saving are mentioned. The network and the activities a weather ship are illustrated. *Subject Headings:* **1. Weather ship networks 2. Atlantic ather ship agreement 3. North Atlantic.**—*M.R.*

INSTRUMENTS

See also: **Hygrometers** (Spencer-Gregory, Rourke), 9.7–6; **Met. instruments** (Perry), 9.7–14; **Upper air wind data, Netherlands,** 9.7–21; **Instrument circulars** (Les Nouvelles), 9.7–46; **Micrometeorological instruments, Germany** (Schnelle, Breuer), 9.7–79; **Atmospheric disturbances and wave recorders** (Skeib), 9.7–108; **Sferics wave form recorders** (Takagi, Isikawa), 9.7–109; **Infrared emission spectra** (Sloan), 9.7–191.

9.7–116 551.508.58

MacCready, Paul B., Jr. (*Munitalp Found. Inc., Calif.*), **The Munitalp cloud theodolite.** *ıerican Meteorological Society, Bulletin,* 38(9):460–464, Oct. **1957.** 4 figs., ref., 2 eqs. **VB**—An inexpensive cloud theodolite has been developed to help an observer find cloud ıitions and movements. For velocity and direction measurements, the observer notes the ıe and direction the cloud moves across a pattern which is optically superimposed on the sky. :hart is provided which simplifies the task of finding cloud speeds (if height is known), ıections, and positions from the measurements. *Subject Headings:* **1. Cloud theodolites Nephoscopes.**—*Author's abstract.*

9.7–117 598.2:591.17:551.508.762

Terres, John K., **Death in the night.** *Audubon Magazine,* N. Y., 58(1):18–20, Jan./). **1956.** photos. **DWB, DLC**—In early Oct. 1954, at least 100,000 migrating birds were ed because of bad weather and ceilometer lights at eastern and southern U. S. airports. Alabama and Georgia, 75,000 were killed in one night in 4 ceilometer lights. Steps were en to cut down this toll by 1) turning off ceilometer lights in bad weather during Oct. 1–15 ıo hazard to aviation would result and 2) providing filters which cut out all but blue or aviolet light that daytime active songbirds are not sensitive to. Military airports have h filters available for air raid precaution and the U. S. Weather Bureau bought 2 filters to out at Nashville and Knoxville. At Nashville not one dead or injured bird was found on a l night when high winds and heavy rainfall (Nov. 2, 1955) made hazardous conditions for ls in that area. *Subject Headings:* **1. Bird migration casualties 2. Ceilometers and rating birds 3. Ceilometer filters 4. Eastern United States.**—*M.R.*

9.7–118 551.508.77

Tarble, Richard D., [**Discussion of**] **F. C. Allen; R. E. Glover; W. U. Garstka and H. M. z: Heated precipitation-gage intake tube.** *American Geophysical Union, Transactions,* 3):330–331, June **1956.** fig., ref. **DWB, DLC**—The author suggests that the operating perature of the heated precipitation gage should be about 35°F. A comparison of records t by a heated gage and by Friez weighing gage showed that the catch from the heated gages ged from 56 to 76% of the Friez gage. This may be explained by the nonstandard shields he heated gage and the bulkiness of the gage that conceivably could create upward wind ents near the orifice of the gage. Further comments are made on the operation of the ted gage. (For abstract on original, *see* 6.8–103, Aug. 1955, *MAB.*) *Subject Headings:* **Heated precipitation gages 2. Precipitation gage comparisons.**—*I.L.D.*

9.7–119 551.508.79:551.579.4

Khobta, P. M., **Integral'naia vertushka.** [An integrating rotating gage.] *Meteorologiia i ologiia,* No. 12:49–50, Dec. **1956.** 2 figs., 2 eqs. **DWB, DLC**—The author describes the truction, operation and underlying principles of an integrating rotating gage for measuring mean velocity of river currents, canal currents, etc. along the vertical, and also the depth ıe point of measurement. This integrating speeds up the water by 2–3 times and does not auxillary parts such as belts, electric current, etc. The gage and its individual parts are trated with a photograph and diagrams. *Subject Heading:* **1. River gages.**—*I.L.D.*

9.7–120 551.508.79:551.579.5:53

Knight, A. H. and Wright, T. W., **Soil moisture determination by neutron scatterin** *Radioisotope Conference, 2nd, Oxford, 1954, Proceedings*, Vol. 2:111–122. Discussion p.12 122. 5 figs., 2 tables, 6 refs. **DLC** (QC798.A1R3). Also issued as *Craigiebuckler, Aberdee Macaulay Institute for Soil Research, Reprint*, No. 276, **1954.**—The method depends on elast scattering when neutrons encounter atomic hydrogen nuclei. Neutron sources are fine divided mixtures of beryllium with polonium or radium. Slow neutrons are detected b radioactivity induced in indium or silver foil. An experimental probe, standardization counting procedure and calibration are described. Effect of organic matter and salt co centration is slight. The method appears to be practicable. *Subject Heading:* **1. Soil moistu instruments.**—*C.E.P.B.*

9.7–121 551.508.8:551.524.1:551.5

†Krechmer, S. I., **Metodika izmereniia mikropul'satsiĭ skorosti vetra i temperatury atmosfere.** [Method of measuring the micropulsations of wind velocity and temperature the atmosphere.] *Akademiia Nauk SSSR, Geofizicheskiĭ Institut, Trudy*, No. 24(151):43–11 **1954.** 24 figs., 5 tables, 26 refs., eqs. **DLC**—The construction of apparatus for studyi micropulsations of temperature and of wind velocity in the atmosphere (a thermometer with double bridge and a microthermometer) is described with the aid of diagrams and photograph The method of calibrating the instrument, the introduction of corrections for temperatu changes, the procedure for obtaining the oscillogram and the method of determining expe mentally the inertia of the individual elements and the apparatus as a whole are describe *Subject Headings:* **1. Temperature microoscillations 2. Wind microoscillations 3. Hot wi anemometers.**—*I.L.D.*

9.7–122 551.508.822(0

†Albrecht, Hans J., **New design aspects of boomerang radio sondes for upper air researc** *Geofisica Pura e Applicata*, Milan, 33:121–145, **1956.** 2 figs., 30 refs., 19 eqs. English a German summaries p. 121. **DLC**—The Boomerang Radiosonde or homing glider was fi developed by Hans J. Albrecht in 1943. Its ascent is effected by normal radiosonde balloo but on release the Boomerang Radiosonde performs a search circle until it locates the directi to the point of launching or the position of the base transmitter. This paper is a comprehensi account of the history of the development of this apparatus, including the aerodynamic pri ciples, the various design types, the electronic work up to 1949 and a detailed presentation the theoretical and operational aspects of this type of radiosonde especially of its control, an discussion of other control possibilities, instrumentation and research applications. *Subj Headings:* **1. Boomerang radiosonde 2. History of radiosondes.**—*I.L.D.*

9.7–123 551.508.8

Gal'chenko, M. S.; Zil'berberg, M. Kh., and Muchnik, V. M., **Radiozond s usilenn ventiliatsiei.** [Radiosonde with increased ventilation.] *Meteorologiia i Gidrologiia*, N 12:46–48, Dec. **1956.** fig., 4 tables, ref., 3 eqs. **DWB, DLC.** Translation into Engl available for reference. **DWB** (Mo8.822 G1482r)—The efficiency of a funnel within the rad sonde box, in order to increase ventilation and thereby diminish the inertia of the temperatu and humidity sensing elements, was tested by comparing seven simultaneous ascents of rad sondes with and without funnels. Tables giving the comparative values of temperature a relative humidity; and temperature, relative humidity, and heights of a surface inversion measured by means of radiosondes with and without a funnel are presented. On the basis the data it is concluded that radiosondes with funnels are superior to those without a funnel measuring temperature and relative humidity in particular temperatures at high altitud *Subject Headings:* **1. Radiosonde ventilation 2. Radiosonde comparisons.**—*I.L.D.*

9.7–124 551.508.8

Letina, E. P., **Metod povysheniia vysoty pod"ema radiozondov.** [A method of increas the height of ascent of radiosondes.] *Meteorologiia i Gidrologiia*, No. 8:48–50, Aug. 19 3 figs., 2 tables, 3 refs. **DWB, DLC**—In order to increase the height of ascent of radioso balloons at night, the cold resistance of the balloon is increased by plasticizing the balloon w hydrocarbons or complex ethers. In this paper the author discusses the method of render

loons more cold resistant by subjecting latex balloons to temperatures of 60–70°C for about min. prior to the flight, with liquid hydrogen, with a solution of dibutylphtalate, etc. Data given on the effect of temperature upon plasticized latex balloons, effect of various liquids on the elasticity module of latex balloons at 50°C. Seasonal dependence of mean elevation treated and untreated balloons and the effect of various plasticizers upon the character-ics of balloons is given. *Subject Headings:* **1. Radiosonde ascent height increase 2. Radio-nde balloon plasticizing.**—*I.L.D.*

9.7–125 551.508.822

Rossi, Veikko (*Finnish Met. Off., Helsinki*), **An optical evaluating method for the Finnish diosonde.** *Geophysica*, Helsinki, 6(1):58–61, **1957.** 4 figs., 4 refs. **DLC**—The conven-nal method of evaluating the Finnish radiosonde took about 2½ hrs. A graphical method, rked out by TOMMILA (1956) results in a great saving of time, as evaluation is continuous the flight is in process. Experiments carried out by the author at Ilmala Observatory since 52 gave, by late 1955, an optical evaluation method which proved useful in tests. The vice and scales, calibration curves and nomograms used in this system are described d illustrated. This method is so rapid that a 75 minimum run can be coded and telegraphed nost as soon as the balloon bursts, since enough time is saved in the computation to allow e charts to be worked up simultaneously. *Subject Headings:* **1. Finnish radiosonde evalua-n 2. Optical radiosonde evaluation systems.**—*M.R.*

9.7–126 551.508.822:551.524.7

Rossi, Veikko (*Finnish Met. Off., Helsinki*), **A laboratory investigation on the radiation or of the radiosonde thermometer.** *Geophysica*, Helsinki, 6(2) 91–105, **1957.** 6 figs., ables, 15 refs. **DLC**—In the laboratory is investigated the two components of the radiation or. The heating of the air in the radiation shield makes the greatest part of the radiation or of the Finnish (Väisälä) radiosonde. An improved radiation shield is constructed for ucing the error. The results of laboratory test show only little radiation error. A lab-tory testing was carried out with 11 different radiosonde types and the results are compared h the results of second radiosonde comparison at Payerne 1956. *Subject Headings:* **1. diosonde errors 2. Radiation error of radiosondes.**—*Author's abstract.*

9.7–127 551.508.822

Smith, L. B., **A study comparing winds aloft measuring equipment at Salton Sea test base.** *ndia Corporation, Albuquerque, N. M.*, [*Report*], SC-3512(TR), Nov. 9, **1954.** 15 p. igs., 2 tables, 4 refs. **DWB** (M08.822 S654s)—Winds aloft, computed from the records tained by two radars, three Askania phototheodolites, and two GMD's following the same loon, are compared, assuming the Askania winds as standards. Correlations with altitude l slant range are made. This is a preliminary report on Project Rawijet which was con-cted to obtain statistical data on the representativeness of high-altitude winds with respect time and space. A final report on Rawijet will be forthcoming. *Subject Headings:* **1. Upper wind instrument comparisons 2. Upper air wind measurement 3. Project Rawijet.**—*thor's abstract.*

9.7–128 551.508.822:016

†Väisälä, Vilho, **Väisälä sounding system.** Helsinki, Sept. 5, **1956.** 8 p. 34 refs. meo. **DWB**—The history of the Väisälä radiosonde system (March 1931–1953) is out-d briefly with many literature citations (1932–1956), the equipment is described, its nical characteristics listed; calibration, corrections, lag, comparisons, ground equipment cording receiver and radiotheodolite), special uses (expeditions at sea and in Arctic), cribed. The instrument is unusually light (300 g) so is convenient for expeditions or for g storage. *Subject Headings:* **1. Väisälä radiosonde 2. Radiosonde bibliographies innish radiosonde.**—*M.R.*

9.7–129 551.508.822

Väisälä, Vilho (*Inst. of Met., Univ. Helsinki*), **Radiation error of different radiosondes Payerne, 1956.** *Geophysica*, Helsinki, 6(1):1–6, **1957.** 3 tables, 8 refs., eqs. **DLC.** Also ed as *Helsinki. Universitet. Meteorologiska Institutet, Mitteilungen*, No. 79, 1956.—A

comparison of the day and night radiosonde ascents at Payerne for 100, 70, 50 and 30 m heights, shows the magnitude of the radiation error at each height for each of 14 radiosond types. The greatest errors were at 30 mb and for the Indian type I (fan) 11.5°C, Frenc 10.6°C, and U.S.S.R. (10.0°C) and the least for the Finnish radiosonde (2.2°C). The Finnis radiosonde is the only one that is corrected for radiation error. The U. S. radiosonde give 3.2°C or less correction at 30 mb or lower levels, respectively. *Subject Headings:* **1. Radiatio error of radiosondes 2. Radiosonde comparison data 3. Radiosonde comparisons 4. Pay erne, Switzerland.**—*M.R.*

9.7–130 551.508.9

Vonnegut, B.; Moore, C. B.; Ehrenfeld, John and Smallman, C. R. (*all, Arthur D. Littl Inc., Cambridge, Mass.*), **Determining the concentration of fogs and other aerosols by a spac charge measuring instrument.** (In: Conference on the Physics of Cloud and Precipitatio Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 122–130. 5 figs 7 refs., eqs.) **DLC** (QC921.5.U5), **DWB**—A newly-developed apparatus measures aeros particles by first charging them by point discharge and then using a Faraday cage to measu the resulting space-charge density. For particles with diameters of more than a few tenth of a micron this apparatus gives a response that is proportional to the surface area of th particles per unit volume. *Subject Headings:* **1. Aerosol measurement 2. Fog density mea urement.**—*Authors' abstract.*

9.7–131 551.508.91:551.510

Whitby, K. T. (*Univ. of Minnesota*), **Rapid general purpose centrifuge sedimentatio method for measurement of size distribution of small particles, Pt. 1, Apparatus and metho** *American Society of Heating and Air-Conditioning Engineers, Transactions*, 61:33–50, pu **1956.** 7 figs., 4 tables, eqs. **Pt. 2, Procedures and applications.** *Ibid.*, p. 449–462. 7 figs 7 tables, 4 refs., eqs. **DWB** (P A512sw)—Apparatus, basic method, detailed procedures an applications of method of particle size determination in range from 0.05 to 100μ. *Subje Headings:* **1. Dust size distribution measurement 2. Aerosol analysis 3. Particle si determination.**—*M.R.*

9.7–132 551.508.

Wilcox, James D. (*Chem. Corps., Chem. & Radiological Lab., Md.*), **Isokinetic flow a sampling of airborne particulates.** (In: Conference on the Physics of Cloud and Precipitati Particles, Sept. 1955, **Proceedings.** Pub. N. Y., Pergamon Press, **1957.** p. 177–183. 3 figs 2 tables, 15 refs.) **DLC** (QC921.5.U5), **DWB**—Isokinetic conditions prevail when there no divergence of flow lines around the sampler inlet. The velocities of the sampled and t sampling streams must be equal, and the sampler inlet must face directly into the sampl stream in order to minimize or eliminate divergence of flow lines at the sampler inlet. Wh divergence of these flows is present there is the possibility of particle-size fractionation. Erro incurred by deviation from isokinetic conditions are discussed, and methods of estimati these errors are reviewed. Results of other investigators are reviewed. Recommendatio and procedures for sampling isokinetically are presented. *Subject Heading:* **1. Aerosol sa pling and analysis.**—*Author's abstract.*

9.7–133 551.508

Teneva, M. (*Sofia, Bulgaria*), **Műszer a vízszintes látástávolság meghatározására.** [instrument for determining horizontal visibility.] *Időjárás*, Budapest, 61(1):9–14, Jan./F **1957.** 5 figs., 2 tables, 2 refs. English summary p. 9. **DLC**—An instrument for visibil measurement is described and illustrated. It consists of a telescope on a tripod, and a fra mounted in front of the telescope. For visibility measurement the frame is gradually cover up with a piece of sanded glass, whereby the contrast between an object and the backgrou gradually diminishes and finally disappears. The position of the glass at the moment contrast disappearance is read on a scale which indicates the degree of visibility. The p formance of the instrument was found to be within permissible error. Its advantage o simple estimation of visibility is that 4 to 5 objects at 100 m, 1.5 km and 20 km will serve

cient reference for measurement of all values of visibility. *Subject Headings:* **1. Visibility ruments 2. Horizontal visibility.**—*G.T.*

9.7–134 551.508.92:551.591.6:535.7

Foitzik, L. (*Berlin*), **Die Reichweite von enggebündelten Scheinwerferstrahlen.** [The e of a narrow beam searchlight.] *Optik*, Stuttgart, 12(2):85–93, **1955.** 8 figs., 8 refs. —The range of a searchlight beam depends on the strength of the light source, the size of object and the turbidity of the atmosphere. Experiments using fixed balloon targets and anes to determine the range under various conditions show that a 5 fold increase in in- ity of the light only increases the range 10%. Distance of observer from target had greater t on visibility than increase of intensity of beam. Visual range with use of telescopes of ous magnifying powers gave indications that the effect of distance is not as great (with a cope) as with the naked eye, since the field of vision is more limited and does not enlarge he same rate as with the naked eye. *Subject Headings:* **1. Searchlights 2. Visibility surements.**—*M.R.*

9.7–135 551.508.93:535.242

Sartor, Eugene E., **Transmissometer components: test report.** U. S. Signal Corps ineering Labs., Fort Monmouth, N. J. Project DA 3-36-02-042, Test Report T-1345, . 24, **1954.** 15 p. 14 figs., 10 photos. **DWB**—An automatically transmitting (by Morse) transmissometer, designed for use with automatic meteorological station AN/GMT-2( ) modification of a Bureau of Standards prototype, is described in great detail. All parts, uding projector, receiver and transmitter illustrated tests made to determine performance ribed and recommendations for mass production included. The present model operates 6 pulses per sec over a baseline of 1000 ft, and is sensitive to variations in dust, smoke, or fog content of atmosphere. It can operate for about a year except under severe icing litions. *Subject Headings:* **1. Transmissometers 2. Automatic weather stations 3. Visi- y meters.**—*M.R.*

9.7–136 551.508.94

Dolezalek, H., **Freiluft-Isolator mit über 10^{14} Ohm Widerstand für alle Klimate: ein rag zur luftelektrischen Messtechnik.** [Free-air insulator with over 10^{14} ohms resistance ll climates: a contribution to atmospheric electricity measurement technique.] *Geofisica e Applicata*, Milan, 33:223–228, **1956.** fig., 8 refs. Also English version as Germany. tscher Wetterdienst, Contract AF 61(514)-640, Technical Note, No. 5, Jan. 20, **1956.** 11p., s., 7 refs. English, German and French summaries p. 223. **DLC**—The structure of a free- nsulation suitable for atmospheric electricity studies is described by the author with the f a diagram. Its maintenance and operation are described and the measurements requiring use of such an insulator and the general properties of the latter are discussed. *Subject ling:* **1. Atmospheric electricity insturments.**—*I.L.D.*

9.7–137 551.508.94:551.594.13

Imianitov, I. M., **Metody izmereniia gradientov provodimosti i ionnoi kontsentratsii v osfere.** [Methods of measuring gradients of conductivity and ionic concentrations in the osphere.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, 58(120):3–7, **1956.** s., 14 eqs.,, fig. **DLC**—In order to reduce the error amounting to 10% in measurements nductivity gradients and ionic concentration in the atmosphere, the author describes the truction and principle of apparatus capable of measuring these quantities at several levels ltaneously. The apparatus is illustrated by means of a diagram, and equations are loped for measuring conductivity and ionic concentration which allow more accurate surement of these quantities. *Subject Headings:* **1. Conductivity meters 2. Electrical uctivity gradient 3. Ion concentration.**—*I.L.D.*

9.7–138 551.508.94:551.594.1/2

Imianitov, I. M.; Mikhaĭlovskaia, V. V.; Ziganov, N. P. and Strel'tsova, M. B., **Pribor dlitel'nykh izmereniĭ napriazhennosti electricheskogo polia atmosfery v slozhnykh me-**

teorologicheskikh usloviiakh. [Instrument for continuing measurements of the intensi the atmospheric electric field under complex meteorological conditions.] *Akademiia SSSR, Izvestiia, Seria Geofiz.*, No. 9:1121–1127, **1956.** 10 figs., 9 refs. **DLC**—A descri of the circuit diagram and construction of an apparatus for measuring the intensity o electric field of the atmosphere. Also, the results of measurements of the intensity o atmospheric field are presented. *Subject Headings:* **1. Atmospheric electricity instrum 2. Atmospheric electricity measurements.**—*I.L.D.*

9.7–139 551.508.94:551.515.4:551.59

Loch, B. F., **Opytnye nabliudeniia za chislom grozovykh razriadov.** [Experim observations of the number of thunderstorm discharges.] *Leningrad. Glavnaia Geofiz kaia Observatoriia, Trudy*, 58(120):47–52, **1956.** ref., 2 tables, 3 figs. **DLC**—With th of a circuit diagram the author describes the construction, characteristics and functioni improved thunderstorm recorders. Basically it is a tiratron with a cold cathode. metage between the anode and cathode is such that it is 3–5 volts lower than the potent incandescence. Recordings of thunderstorm discharges were made simultaneously with instruments at four stations of the Ukrainian Hydrometeorological Service and at Voei Data on diurnal variations of thunderstorm discharges during July and August 195 presented. *Subject Headings:* **1. Thunderstorm recorders 2. Lightning disch 3. Thunderstorm electricity.**—*I.L.D.*

9.7–140 551.508.94:551.5

Reinet, Ia. Iu., **Kombinirovannyĭ schetchik atmosfernykh ionov.** [Combinatio mospheric-ion counter.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, 58(23–30, **1956.** 24 refs., 6 figs., table. **DLC**—A brief outline of the defects of GERDIEN's EBERT's apparatus which employs the aspiration method for measuring the density of ic the atmosphere and review of subsequently developed counters using the method of ch of internal electrodes to measure light ions and counters for measuring heavy ions are prese This is followed by a detailed description of the construction, principles and operatio counter for measuring both heavy and light ions. Data are presented on the annual vari of light and of heavy ions as measured at Tartu. *Subject Heading:* **1. Ion counters.**—*I.*

9.7–141 551.508.94:551.

Wieland, Walter, **Lassen sich mit dem Ceraunographen die Gewitterzüge bestim** [Can thunderstorms be located by means of a ceraunograph?] *Schweizerische Naturforsc Gesellschaft, Verhandlungen*, **1953.** p. 78–82. 3 figs., 2 refs. **DLC.** Reprinted as *Switzer Eidg. Kommission zum Studium der Hagelbildung und der Hagelabwehr, Wissenschaftliche teilungen*, No. 4, **1953.**—The ceraunometer developed by B. F. J. SCHONLAND (*We* No. 6, 1948) was modified by M. BOSSOLASCO by addition of a recording galvanometer. I automatically records lightning strokes but their location has to be determined by an obs The instrument has been in use at Locarno-Monti for several years, including two yea comparative measurements. Within a range of 15 km, 90% of the lightning stroke recorded; intense precipitation and low clouds definitely interfere with reception. It is cluded that the ceraunograph is not suited in its present form for accurate recording of ligh strokes in a mountain region. *Subject Headings:* **1. Ceraunometers 2. Lightning reco 3. Thunderstorm location.**—*G.T.*

9.7–142 551.508.95:551.507.

Chagnon, Charles W., **Balloon borne air sampling apparatus.** *U. S. Air Force. bridge Research Center, Instrumentation for Geophysical Research*, No. 6, April **1957.** 5 figs., 2 tables, ref. **DLC**—A balloon-borne air sampling apparatus for the analysis of in the upper atmosphere is described. By the use of selective chemical absorbents to pe the initial stages of the air analysis "in situ," the problems of sample collection and transp tion are minimized. Various atmospheric constituents may be determined either sing simultaneously by the selection of the proper absorbents. Although designed for ba borne air sampling, the components of the apparatus are described in detail, since they

dapted readily to other types of high altitude equipment. Several successful flights have made for the determination of the carbon dioxide content of the stratosphere. *Subject lings:* **1. Air sampling instruments 2. Upper air sampling.**—*Author's abstract.*

9.7–143 551.508.952

Tateno, Japan. Aerological Observatory, **Observations of the total amount of ozone over no.** *Tateno, Japan. Aerological Observatory, Journal,* 6(1):17–35, Jan. **1957.** 8 figs., bles, 16 eqs. In Japanese; English summary p. 17. **DLC**—The Dobson spectrophotom- No. 52 was installed in the Aerological Observatory at Tateno in spring of the year 1955 neasuring the ozone in the atmosphere. In the first half of this article, a short explanation e instrument, principles of the observation of the total amount of ozone, constants of the uments and sources of errors are presented. In the second half, results obtained from the ration of the wedges, the test of wavelength with mercury lamp, the test of instrumental tants with standard lamps and "long method" observations are reported, and also the that fluctuations of dial readings on the standard lamp test are mainly due to the depend- of the transmission of the lamp bulb on its temperature, is discussed. Finally, the daily n values of the total amount of ozone obtained from the direct sun observations on clear during the period from June 1955 to November 1956, are tabulated. *Subject Headings:* **zone meters 2. Dobson spectrophotometer 3. Tateno, Japan.**—*Author's abstract.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Synoptic analysis textbooks, Japan** (Otani, Saito), 9.7–7; **Forecast manuals, New England** (Penn), 9.7–29; **Snow-rain probabilities, U. S.** (Penn), 9.7–30; **Synoptic analysis and weather forecasting, Germany** (Meyer), 9.7–44; **Synoptic forecasting, France** (Clausse), 9.7–45; **Weather conditions, Japan** (Kobayashi), 9.7–162; **Cyclonic storms and weather summaries** (Linés Escardo), 9.7–169; **Specific weight of air, Belgian Congo** (Bultot), 9.7–215; **Heavy rainfall forecasting, Marcus Isle, Japan** (Neyama), 9.7–226; **Prec. variations and periodicities, Belgian Congo** (Bultot), 9.7–227; **Hailstorms, Brisbane, Queensland** (Newman), 9.7–239; **Climatic changes and weather control,** 9.7–252; **Climatic effects on sugar beet, Belgium** (Sneyers), 9.7–259; special bibliography on **Long Range Forecasting,** p. 875.

9.7–144 551.509.6:551.515.1

Petterssen, Sverre, (*Univ. of Chicago*), **On the magnitude of cyclone development and the bility of large-scale modifications.** *National Academy of Sciences, Wash., D. C., Proceed-* 41(11):815–819, Nov. 15, **1955.** 9 refs., eq. **DWB**—An equation, developed by the or, showing the relation of cyclone development to vorticity, thermal advection, lapse , vertical velocity and supplied heat is used to illustrate that cloud seeding can produce minor changes in a cyclone. Relation to numerical forecasts is briefly discussed. *Subject ings:* **1. Cyclone development 2. Weather modification.**—*A.A.*

9.7–145 551.509.617:551.578.4

Takahashi, Kihei, **On some prevention methods of cornice formation.** *Researches on and Ice,* Tokyo, No. 1:123–126, Nov. **1953.** 7 figs., 7 refs. In Japanese. **DWB**—To l cornice formation, two methods may be employed; (1) alteration of the shape of peak and (2) erection of a wooden fence (SAITO). The first one might be more economical, ially for the area in which wind force is great. *Subject Headings:* **1. Ice prevention 2. Ice ce formation.**—*H. Arakawa.*

ARTIFICIAL PRECIPITATION

See also: **Man's influence on nature,** 9.7–49; **Air flow over mts. and orographic diffusion patterns** (Kassander), 9.7–205; **Nuclei effectiveness** (Manson), 9.7–217.

9.7–146 551.509.615

Mitchell, John Murray, Jr. (*Office of Climatology, U. S. W. B., Wash., D. C.*), **The feasi- of artificial fog dispersal in Alaska.** Wash., D. C., U. S. Weather Bureau, July 2, **1957.**

44 p. 9 figs., 12 tables, 22 refs. Mimeo. **DWB** (M09.65 U587f)—A climatological a
is presented of the characteristics of fog and ice fog at three major Air Bases in Alaska. F
ing a brief survey of fog dispersal methods in general, the climatological data are then emp
to select a "best method" of fog dispersal at each base. Evidence is presented that
all winter fogs at Elmendorf Air Force Base are amenable to local dispersal at the runw
ground seeding with dry ice or silver iodide smoke, and that the incidence of closed te
weather due to fog can potentially be reduced by this means from 3.5% at present to les
1%. Evidence is also presented that conditions of wind and stability during ice fog at F
Air Force Base and Ladd Air Force Base are very often such as to favor local dispersal
fogs by means of horizontal-axis fans. A fan system is proposed in which 15 fans, eac
an effective fanwheel diameter of 15 feet and a dual power setting of 200/400 HP, are posi
along one mile of runway, and directed obliquely across the runway in either of two re
controlled positions. With such an installation the winter-season incidence of closed te
weather due to (ice) fog can potentially be reduced from about 10% at present to a fr
of 1%. *Subject Headings:* **1. Artificial fog dissipation 2. Ice fog 3. Alaska.**—*A
abstract.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

ATMOSPHERIC COMPOSITION

See also: **IGY ionospheric sounding program, Western Hemisphere** (Orsini), **9.7–33**; **History of oceans** (Revelle), **9.7–65.**

9.7–147 551.510.3:551.

†Megrelishvili, T. G. (*Abastuman Astrophysical Obs.*), **O granitsakh primenimosti sum
nogo metoda issledovaniia atmosfery.** [Limits of usefulness of the twilight method of stu
the atmosphere.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.* No. 8:976–983, Aug.
5 figs., 5 tables, 30 refs. **DWB, DLC**—On the basis of twilight observations made
period of years, the author establishes the difference of the unusual brightness of the tw
sky when the height of the "twilight rays" exceed 80 km upon the zenithal distance of th
Possible sources of the twilight brightness are considered. Preliminary results of tw
measurements, according to the method of V. G. FESENKOV are presented; this meth
cludes the influence of repeated scattering of light (simultaneous measurement of brightn
two points of the sky, studied in the vertical of the sun symmetrically with respect to the z
The values of atmospheric pressure and density up to a height of 120–130 km which a
tained, correspond satisfactorily with those obtained by means of rocket measure
Subject Headings: **1. Upper atmosphere density data 2. Twilight sky brightness measure
—*Trans. of Author's abstract.*

ATMOSPHERIC POLLUTION

See also: **Indoor air movement** (Shakhbazian), **9.7–92**; **Dust size distribution measure-ment** (Whitby), **9.7–131.**

9.7–148 551.510.42:551

*Ball, F. K. (*Div. of Met. Physics, C.S.I.R.O., Melbourne*), **Some observations o
plumes.** *Royal Meteorological Society, Quarterly Journal*, 84(359):61–65, Jan. **1958.**
table, 5 refs., 5 eqs. **DWB, DLC**—Observations made between July 1955 and Jan. 1
Aspendale, Victoria at the height of the center line of the plume rising from 4 closely
oil burners (orchard heaters) on the ground were analyzed and the results compare
BOSANQUET's, PRIESTLEY's and SUTTON's models. The Bosanquet solution does not
case, but a crude modification of Sutton's or even Priestley's equation can be applied
prediction of the height of a bent plume of smoke downward from a heat source.
diagrams of data obtained 30 ft and 60 ft downward (height of column vs. wind speed
closeness of fit of Priestley's and Sutton's curves. *Subject Headings:* **1. Smoke plume
prediction 2. Wind speed effects on smoke plumes 3. Aspendale, Victoria.**—*M.R.*

9.7–149 551.510.42

Koshi, S. (*Inst. of Public Health, Tokyo*), **Meteorological study on atmospheric pollution okyo City.** *Meteorological Society of Japan, Tokyo, Journal*, Ser. 2, 34(6):327–335, Dec. . 11 figs., 3 tables, 10 refs., 7 eqs. **DWB, DLC**—Observation of hourly atmospheric concentration by an automatic air sampler has been carried out from Feb. 1955 on the of 53 m above the ground at the Institute of Public Health. The mean hourly variation ıst concentration for each month was similar to the result obtained by other investigators slightly differs from them. In this survey, the concentration in the morning had two ima from April to Sept. The dust concentration at midnight decreased exponentially elapsed time, and the dissipation coefficient k increased linearly with wind velocity. From analysis, it may be concluded that on the day with unstable atmospheric condition the iculate matters in the atmosphere are dispersed by turbulence caused by solar heating er than wind. Under the meteorological conditions of rainy days, the concentration of ce near the ground had an increasing tendency in the day-time, rather than a decreasing due to the washing effect of rain. *Subject Headings:* **1. Atmospheric pollution 2. Air pling and analysis 3. Tokyo, Japan.**—*Author's abstract.*

9.7–150 551.510.42:54

Junge, Charles E. and Ryan, T. G. (*both, A.F. Cambridge Res. Center, Bedford, Mass.*), **y of the SO_2 oxidation in solution and its role in atmospheric chemistry.** *Royal Meteoro- al Society, Quarterly Journal*, 84(359):46–55, Jan. **1958.** 4 figs., 3 tables, 12 refs., 9 eqs. 3, **DLC**—The mechanism of SO_2 oxidation in diluted catalytic solutions was studied. as found that the oxidation stops after a certain pH value is reached. In the same catalytic ions, the maximum possible SO_4^- formation is a linear function of the SO_2 partial pressure e air. This mechanism of SO_4^- formation can account for observed SO_4^- concentrations in, fog, and smog only if some neutralizing cations in the aerosols or traces of NH_3 in the re present. It is shown that in the latter case the system SO_2-NH_3-catalytic solution can ain the main features of SO_4^- formation in our atmosphere. *Subject Headings:* **1. SO_2 ation 2. Atmospheric chemistry.**—*Authors' abstract.*

UPPER ATMOSPHERE—IONOSPHERE

See also: **Upper atmos. physics** (Mitra), 9.7–17; **Aviation met. service, Trappes, France** (Viaut), 9.7–73; **Twilight sky brightness measurements** (Megrelishvili), 9.7–147; **Lyman beta radiation splitting** (Kato), 9.7–185; **Stratospheric temperature variations** (Chiu), 9.7–199; **Solar-magnetic relationships** (Ward), 9.7–261; **Noctilucent and stratospheric clouds** (Khvostikov), 9.7–268.

9.7–151 551.510.5:551.507.362.1

Michigan. Univ. Engineering Research Institute, **Atmospheric phenomena at high ıdes, May 1 to July 31, 1957.** Contract DA-26-039 SC-64659, Quarterly Report, Oct. . 38 p. 10 figs. (incl. photos), 9 tables, forms, 4 refs. **DWB** (M10.5 M624ad)—Two ıde Aerobee rockets were flown successfully at Ft. Churchill in July. Data reduction and ysis of records on SM1:01 has continued. Theoretical studies have continued on the cts of the explosion-produced modulation of DOVAP records, finite amplitude of propaga- effects, the effect of variation in velocity of propagation of electromagnetic radiation on DOVAP system, the possibility of measuring ambient pressure at very high altitudes, and lynamics of rarefied gases. *Subject Heading:* **1. Upper atmosphere research 2. Rocket rvation techniques. I. Bartman, F. L. II. Liu, V. C. III. Otterman, J. IV. Wilkie, W. J. enzel, E. A.**—*Authors' abstract.*

9.7–152 551.510.5

Sandulescu, C. M., **Atmosfera standard internationala.** [International Standard At- here.] *Aripile Patriei*, Bucharest, 2(11):23, Nov. **1956.** table. **DLC**—A table of s known as the International Standard Atmosphere is presented and the meaning of the nts listed in each column is explained. *Subject Heading:* **1. International standard sphere.**—*G.T.*

9.7–153 551.510.52:551.577

Katow, K. (*Geophysical Inst., Tokyo Univ.*), **Analysis of tropospheric structure dur Baiu season in 1954.** *Meteorological Society of Japan, Tokyo, Journal*, Ser. 2, 34(4):19 Aug. **1956.** 19 figs., 20 refs., 6 eqs. **DWB, DLC**—In Pt. I, the fields of wind and temp in Baiu season are analyzed, and the cross sections along the 140°E meridian for the pe to 28 June 1954 are presented. It is shown that the frontal layer in Baiu season is charac by weaker contrast of temperature than in winter. In Pt. II, the water vapor con troposphere is treated as an element for studying the structure of Baiu front. The hor gradient of water vapour content is comparatively large compared with that of temp in the vicinity of the front. Moreover, the quantity of condensation is computed fr continuity equation of water vapor content and compared with the observations mechanism of supply of water vapor is also considered. *Subject Headings:* **1. Tropos structure 2. Bai-u 3. Japan.**—*Author's abstract.*

9.7–154 551.510.5

Okabayashi, T. and Yamasaki, M. (*both, Aerological Obs.*), **On the total amount of over Tateno and its relation to meteorological conditions in the lower stratosphere.** *Japan. Aerological Observatory, Journal*, 6(1):37–44, Jan. **1957.** 4 figs., 8 refs. In Jap English summary p. 37. **DLC**—The results of the analysis on the variations of the amount of atmospheric ozone measured with the Dobson spectrophotometer No. 52 at T from July 1955 to June 1956, and the investigation of its relations to the meteorological tions of the lower stratosphere are presented. The results are abridged as follows: 1) annual variation of the total amount of ozone during the course of this period, a smaller a is found in autumn and a larger in spring as in other countries. The minimum occurs first decade of October and the maximum in the first decade of March. The amplitu the day-to-day variation are small in autumn and large in spring; 2) In the day-to-da seasonal variations the positive correlation between the total amount of ozone and the peratures of the standard pressure levels (correspond to potential temperature) in the stratosphere are found; 3) With regard to the day-to-day variation it is shown that amount varies almost inversely with the height of the standard pressure level or troug ridge in the lower stratosphere; 4) In the day-to-day variation the larger total amount of appears generally after the appearance of the maximum S-component of the wind ve averaged for 300, 250 and 200 mb levels, and the smaller amount after the minimum S ponent or the maximum N-component. At this stage, however, no distinct connectio obtained with regard to E-W component; 5) The relation mentioned in (3) is most disting at about 250 mb level (about 10,000 m in altitude) and it seems to become uncertain at or lower levels gradually. *Subject Headings:* **1. Ozone variations 2. Weather effec ozone amounts 3. Tateno, Japan.**—*Authors' abstract.*

9.7–155 551.510.534:535.3

Yamasaki, M.; Shimizu, M.; Fukuda, T. and Akita, T. (*all, Aerological Obs.*), **Obser of the vertical distribution of ozone by an airborne spectrograph.** *Tateno, Japan. Aero Observatory, Journal*, 6(1):45–54, Jan. **1957.** 7 figs., 3 tables, 11 refs., 5 eqs. In Jap English summary p. 45. **DLC**—By a small ultra-violet spectrograph, which was lifted km by four balloons, the vertical distribution on the atmospheric ozone was observed on 13, 1956, at Tateno (36°03′N, 140°08′E). In this report accounts are given of the instru the flight and the result obtained. *Subject Headings:* **1. Vertical ozone distribution 2. trographs 3. Tateno, Japan.**—*Authors' abstract.*

9.7–156 551.510.535:551

Bonnet, G.; Hunaerts, J. and Nicolet, M., **Analyse de résultats ionosphériques ob en Afrique lors de l'éclipse de soleil du 25 février 1952.** [Analysis of ionospheric observa made in Africa during the solar eclipse of Feb. 25, 1952.] *Belgium. Institut Royal M logique, Contributions*, No. 38, **1957.** 18 p. 9 figs., 6 eqs., 9 refs. **DWB**—Results of spheric observations made in Africa during the eclipse of Feb. 25, 1952 are coordinate analyzed. E-region maxima were formed by the same type of solar emission at each st and the recombination coefficient remained the same. The variable parameter is th

ch reflects the changes in the vertical atmospheric structure at the geographic, or better , the geomagnetic equator, and those in higher latitudes. The particular aspects of nal emission are explained. *Subject Headings:* **1. Ionospheric observations 2. E layer olar eclipse, Feb. 1952 4. Belgian Congo.**—*A.V.*

9.7–157 551.510.535:621.396.11:621.396.029.6

Bramley, E. N., **Directional observations on H.F. transmissions over 2100 KM.** *Institution of Electrical Engineers, London, Proceedings, Pt. B*, 103(9):295–300, May **1956.** 5 figs., bles, 5 refs. Also review of above article, entitled **Ionospheric reflection of H.F. waves,** *nstitution of Electrical Engineers, London, Journal, n.s.*, 2(17):282–283, May **1956.** 2 figs. C—Previous studies showed that directional fluctuations in receipt of pulsed short wave als from a distance of 700 km were due to ionospheric irregularities. An extension of this k to a distance of 2120 km at 5 and 11 Mc/s showed that rapid fluctuations were larger n at 700 km (especially at night on 5 Mc/s) and were unaffected by ionospheric or magnetic ms. Experiments were carried out from Dec. 1952 to Oct. 1954 between Malta and Wink-l, Berkshire. Fluctuations about mean were within ±1° for 1F and ±2° for 2F echoes, for 1F echo individual bearings had a s. d. of 0.8° about the mean which was within 0.2° he correct bearing. *Subject Headings:* **1. Ionospheric radio wave propagation 2. Ionoeric radio wave reflection.**—*M.R.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: **Reversible adiabatics** (Fea), 9.7–99; **Kinematic vortex theory and steering of typhoons** (Matsumoto), 9.7–181.

9.7–158 551.511:551.558

Mertsalov, A. N., **Kachestvennoe opredelenie uporiadochennykh vertikal'nykh dvizheniĭ dukha po baricheskomu poliu.** [Qualitative determination of regular vertical air movet according to the pressure field.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy*, 72):59–64, 1956. 2 refs., 2 figs., 5 eqs. **DLC**—Formulas and rules for determining vertical notion from the structure of the pressure field and its variations are developed by proceeding n the horizontal divergence-convergence of the wind and assuming that divergence deines descending and convergence air motion. Equations are developed for estimating vertical currents produced by friction of the earth's surface from the curvature of the ar, magnitude of the pressure gradient and density of the isobars, and for estimating the ical currents produced by wind distribution independently of friction. These are, retively:

$$w = a_{(z)}(p_n k + p_n n)$$

$$\frac{l^2}{B}K = k\frac{dH_3}{dt} - Hn\frac{dk}{dt} + \frac{dH_n n}{dt}.$$

derived rules are presented and explained in physical terms. *Subject Heading:* **1. Vertical ent theory.**—*I.L.D.*

9.7–159 551.511.32:551.557.2

Doumont, G., **L'advection des isohypses relatives, avec application à une couche isoque particulière: 850–500 mb.** [Advection of relative isohypses as applied to the particular aric layer 850–500 mb.] *Belgium. Service Météorologique de l'Aviation. Régie des Voies iennes, Bulletin Trimestriel*, March/May **1957.** p. 1–15. 14 figs., 2 tables, 12 refs. glish and German summaries. **DWB**—After recalling the general formula for calculating ective tendency of thickness, and showing the importance of the ageostrophic component, author develops a new formula for the 850–500 mb layer, expressing the advective tendency ts thickness, and containing directly measurable aerological values. From this formula ethod of indirect evaluation of ageostrophic tendency, and of approximate indication of the

mean value of ageostrophic shear. After a discussion of the concept of advective c properties of tendencies represented by hodographs are examined and errors resultin adaptation of hodographs to a straight line are discussed. Ageostrophic tendency is not negligible and the internal structure of the layer subject to advection often plays an imp part. *Subject Headings:* **1. Advection of relative isohypses 2. Ageostrophic shear.**—*A*

9.7–160 551.511.6:5

Kao, Shih-Kung, **On total momentum vorticity with application to the study of the g circulation of the atmosphere.** (In: California. Univ. at L.A. Dept. of Meteorology, C AF 19(122)-48, General Circulation Project, Final Report, March 15, **1955,** Article 12. 14 figs., 21 refs., 72 eqs.) **DWB**—The general properties of the volume integral for th ticity of the momentum vector are studied theoretically and some basic theorems are d Basic hydrodynamic laws for the polar cap are given and the effects of friction and of mou are analyzed. The theory is compared with the actual distribution of mean surface and zonal winds. Shape and orientation of the trough and ridge lines of the atmospheric pe tions are important for the transport of angular momentum and momentum vorticity. *ject Headings:* **1. Vorticity 2. General circulation 3. Northern Hemisphere.**—*A.A.*

GENERAL CIRCULATION

See also: **Vorticity, Northern Hemisphere** (Kao), 9.7–160.

9.7–161 551.513:551.557 551.501.6:551.501.7:5

Vuorela, Lauri A. (*Inst. of Met., Univ. of Helsinki*), **On the observed zonal and mer circulations at latitudes 15°N and 30°N in winter.** *Geophysica,* Helsinki, 6(2):106–120 12 figs., 13 refs., 7 eqs. **DLC**—Time cross sections of the mean zonal and meridional c tions, computed directly from observations of the wind, at latitudes 15°N and 30°N fo 1950 to March 1951 are presented and discussed. Mean vertical motion from the surface to 100 mb level in the latitude belt considered and the energy flux due to the meridional circulation across the respective latitudes have been calculated. *Subject Hea* **1. Upper air climatology 2. Aerological cross sections 3. Mean circulation diagra** *Author's abstract.*

9.7–162 551.513.1:551.

Kobayashi, S., **On the asymmetry of circumpolar currents.** *Journal of Meteorc Research,* Tokyo, 8(8):503–507, Oct. **1956.** 9 figs., table, 7 refs. In Japanese; Englis mary p. 503. **DWB, DLC**—A study is made on the relation between the weather con in Japan and the asymmetry of the circumpolar currents on the basis of 5-day mean 5 Northern Hemisphere maps. Simplifying the method which was adopted by La Se 1954, the areas enclosed by the 18,000 ft contours on 500 mb chart are computed a percentage of the area on the Pacific side to the whole area is defined as *P.* The tren suggests that if it is large in May, the Baiu-phenomena are remarkable and the unusual co occurs over Japan. Furthermore the 5-day mean temperature anomaly in Japan is s for the same periods of the asymmetry as in La Seur's paper, but a high correlation obtained. *Subject Headings:* **1. Zonal circulation 2. Weather conditions 3. Japan.** *thor's abstract.*

9.7–163 551.513.2:551

Mohri, K. (*C.M.O., Tokyo*), **An analysis of jet streams over Japan on Nov. 3,** *Meteorological Society of Japan, Journal,* Ser. 2, 34(1):29–33, March **1956.** 8 figs., 8 refs **DWB, DLC**—High tropospheric conditions of wind and temperature fields of Nov. 3 are analysed in detail. Observed winds show the two branches of jet stream, i.e., subtr and polar-front jet; the former at 200 mb near 37°N, the latter at 260 mb near 45°N. main tropopauses (i.e., tropical, polar-front, and polar tropopauses) are distinguished subtropical upper frontal zone is situated under the subtropical jet in its well-developed *Subject Headings:* **1. Jet stream analysis 2. Tropopause 3. Japan.**—*Author's abstract.*

9.7–164 551.513.2:551.557.3/5

Yamada, H. and Matsuhashi, S. (*both, Aerological Section, Japan Met. Agency*), **Seasonal iation of the jet stream over Japan.** *Tateno, Japan. Aerological Observatory, Journal,* .):1–7, Jan. **1957.** 9 figs., 9 refs. In Japanese; English summary p. 1. **DLC**—Mean ostrophic west-wind profiles along the meridian 140°E (30–44°N) are presented. Seasonal iations of the monthly mean jet stream are discussed. Main results obtained are as follows: the principal mean jet stream strengthens as it moves southward in autumn; on the other nd, it weakens as it moves northward in spring; 2) the secondary monthly mean jet stream ound clearly from spring to summer about five degrees north of the principal jet; 3) both them have small yearly changes in seaonal variations. *Subject Heading:* **1. Jet stream iations.**—*Authors' abstract.*

ATMOSPHERIC DISTURBANCES

See also: **Storm surges, North Sea** (Weenink), 9.7–61; **Frontal passage effects on sulfur metabolism in rabbits** (Häfelin, Lotmar), 9.7–95; **Radar rain observations and convective cells** (Leach), 9.7–101; **Radar hurricane tracking** (Rockney), 9.7–103; **High frequency radio noise** (Horner), 9.7–105; **Atmospheric disturbances and wave recorders** (Skeib), 9.7–108; **Thunderstorm recorders and electricity** (Loch), 9.7–139; **Cyclone development and weather modification** (Petterssen), 9.7–144; **Hurricane wind maxima, N. Y. and Fla.** (Myers), 9.7–207.

9.7–165 551.515.13/2

Newman, B. W.; Martin, A. R. and Wilkie, W. R. (*all, Bureau of Met., Australia*), **Occurce of tropical depressions and cyclones in the Australian region during the summer of 5–56.** (In: Tropical Cyclone Symposium, Brisbane, Dec. 1956, **Proceedings.** Pub. c. **1956.** p. 25–55. 19 figs., table.) **DWB**—During the 1955–56 cyclone season 32 turbances of variable magnitude were detected in the Australian tropical region. There were main areas of apparent origin of the more definite depressions: 1) Fiji–New Hebrides cases); 2) North and N.E. Coral Sea, including New Caledonia (5); 3) Northwest Coral Sea rth Queensland coastal waters) (5); 4) Northern Territory–Arafura Sea and Gulf of Carntaria (3); 5) Timor Sea (4); 6) Northeast Indian Ocean (Cocos Island area) (1). Of the tracked storms only six showed a reasonable semblance to the "classical" parabolic path t is moving south-west from the locality of development and turning between lat. 20° and to follow a south-easterly course. All other storms appeared to be deflected by some cause one or more positions along the track. Data in regard to rainfall, winds and seas were ited in the case of storms which kept over the ocean. In some cases, due to lack of reports, true structure and path have been difficult to determine when the track was over the ocean, ile in other cases it was only from some fortuitous ships' reports that more specific data were tained. An outstanding feature of the intense cyclone passing over Townsville was the her moderate intensity of precipitation along the coast up to the time the storm passed nd. Westerly winds over the mountains on the northern side of the cyclone were turbulent l destructive, causing extensive damage to forests as well as to far northern coastal towns. tensive flood rains over Queensland resulted from tropical rain depressions. The cyclone of rch 24 to 30 from Arnheim Land through western Queensland was to some extent an eption to the rule of diminishing cyclonic circulation when a system passes inland. This turbance degenerated at first, but temporarily intensified again over south-west Queensland. e cyclone of Feb. 15 to March 4 was remarkable for its track and duration, particularly as ravelled over land for nine days without losing its identity, and emerged over the sea again er multiple recurvature to become one of the most intense and destructive cyclones to vel down the west coast of Western Australia, south of Shark Bay. *Subject Headings:* **Cyclone development 2. Cyclone tracks 3. Tropical cyclones 4. Australia.**—*Authors' ract.*

9.7–166 551.515.13(52)

Masui, T., **On the relations between high-level cyclones and surface cyclones near an.** *Yokohama, Japan. National Univ., Science Reports, Sec. 1,* No. 5:58–64, Sept. **1956.**

refs., 13 charts. In Japanese; English summary p. 58. **DLC**—High-level cyclones form an upper trough by cutting-off process. The principal region where high-level cy affecting Japan originate is S.E. Siberia or N.E. China, except in the Baiu season. In cases one or two surface cyclones develop in front of the same trough at lower latitude general, high-level cyclones move toward S.E. and surface cyclones toward N.E. E Japan they gradually approach each other and usually merge into a deep cyclone which its way to the North Pacific Ocean or the Okhotsk Sea as an intense cyclone. The pro merging is very complex. In this paper the author does not go into details of the ph process but merely deals with the tracks of cyclones as derived from data covering the 1951–1955. *Subject Headings:* **1. Cyclone track statistics 2. Synoptic climatology 3.** —*Author's abstract.*

9.7–167 551.515.2(764, 766, 781) 551.579.4(764, 76

How storms are born and mature. *Life*, Chicago, 42(22):28–33, June 3, **1957.** p **DLC**—Schematic maps show (a) how tornadoes form and (b) sections of Texas, Okla and vicinity where tornadoes (in families) and floods which exceeded any in years, we perienced during April 18–May 21, 1957. Over 550 tornadoes were reported in 6 states period. Photography of actual tornadoes and tornado damage and relief activitie illustrate vividly the catastrophies involved. An aerial photograph of housing develo (Ruskin Heights) near Kansas City where 30 people were killed as a wide swath o destruction was cut through the area on May 20, 1957. *Subject Headings:* **1. Torn Texas-Oklahoma-Kansas (1957) 2. Floods, Texas-Oklahoma (1957) 3. Texas 4. homa 5. Kansas City.**—*M.R.*

9.7–168 551.515.2:5

Ikegami, Ryohei (*Tokyo Gakugei Univ.*), **Relation between the periods of micros and the situation of typhoon.** *Tokyo. Univ. Earthquake Research Institute, Bu* 33(4):681–687, Dec. **1955.** 10 figs., 3 refs. **DWB**—Periodograms for microseisms re at the Tokyo Astronomical Observatory during 5 days (Sept. 11–15, 1950) when Ty "Kezia" passed from the S. Pacific through Kyushu over the Sea of Japan and Hokkai constructed for periods of 2.0 to 6.0 sec amplitudes were measured every .2 sec. Corr coefficients were computed and periodograms classified into 2 major categories: a) thos sharp peaks, and b) those with no sharp peaks. Those in group (a) are characterized sec to 4.4 sec periods whereas group (b) have mixed periods. During Sept. 11 and 12, the typhoon was in the Pacific S.W. of Japan, periods (a) predominated, whereas on 13–15 when the typhoon had passed over land to the Japan Sea, irregular periods (b dominated. However, microseismic waves do not always come from the typhoon c *Subject Headings:* **1. Microseism periods 2. Typhoon "Kezia," (1950) 3. Japan area.**—

9.7–169 551.515.2:551.50

§Linés-Escardo, Alberto, **Notas relativas al estado del tiempo durante los meses de Oc Noviembre y Diciembre de 1955.** [Notes on the weather during Oct., Nov. and Dec. *Revista de Geofisica*, Madrid, 15(58):173–187, April/June **1956.** 8 figs. Spanish and E summaries p. 173. **DWB**—A new section will appear as a regular feature, devoted to u storms or rain occurrences attending surface and upper air synoptic developments, hemis jet stream relations, etc. during the 3 months mentioned in the title, as affecting the I Peninsula. *Subject Headings:* **1. Cyclonic storms 2. Weather summaries 3. Synopti history studies 4. Spain.**—*M.R.*

9.7–170 551.

Matano, H. (*Met. Res. Inst., Kyoto Univ.*), **A note on the vertical structure of ty** *Meteorological Society of Japan, Tokyo, Journal*, Ser. 2, 34(5):288–292, Oct. **1956.** 2 tables, 3 refs. English summary p. 288. **DWB, DLC**—The variation of the angular v with height is examined for several typhoons and is found to exist in a barotropic layer lower part of typhoon vortex, which leads to some conclusions concerning the travelling and the change of situation of typhoon. *Subject Headings:* **1. Vertical structure of ty 2. Typhoon structure.**—*Author's abstract.*

9.7–171 551.515.2/3

Massachusetts. Legislative Research Bureau, **Report . . . relative to minimization of mage from hurricanes and other natural disasters.** Boston, Wright & Potter, legislative inters, 1956. 69 p. figs., tables. Running title: House, No. 2727, Feb. 1956. **DWB** 115.2 M414r)—A factual report on hurricanes, floods, tornadoes, and other serious disasters ich have affected Massachusetts and nearby areas of New England, on the Weather Bureau cilities, forecasts and warnings; on flood control and prevention of flood damage, etc. The ucture, path, winds, frequency in various 5° squares, dates, damage, and deaths from ajor hurricanes 1635–1955; trends in hurricanes and flood frequency; methods of observation; dar tracking; tornado warning service, engineering and building measures to prevent damage d, finally, insurance are covered. *Subject Headings:* **1. Disaster minimization 2. Hurri-nes, New England 3. Tornado warning service 4. New England.**—*M.R.*

9.7–172 551.515.21

§McRae, J. N. (*Bureau of Met., Australia*), **Formation and development of tropical cyclones ring the 1955–56 season in Australia.** (In: Tropical Cyclone Symposium, Brisbane, Dec. 56, **Proceedings.** Pub. Dec. **1956.** p. 233–261. 25 figs., table, 15 refs., eqs.) **DWB**—e formation of tropical cyclones in the Australian region during the 1955–6 season was vestigated, keeping RIEHL's (1954) basic aspects of tropical cyclogenesis in mind. Mean onthly stability conditions were examined for relevant stations. When 200 mb divergence s located, using models based on the vorticity equation, the stability of nearby soundings d the mean temperature field in the troposphere were examined. Mean soundings indicate at normally the stability is favorable for warm cored cyclogenesis over the tropical oceans ound Australia in the warmer months, becoming less favourable inland and in the subtropics. om Dec. 1955 to April 1956 almost all cases of definite (from a model) 200 mb divergence the tropics were found on the warm side of the jet axis, where the velocity, anticyclonic rvature and anticyclonic shear increased downstream. When such a pattern occurred over e continent, there was usually no significant development, but over the oceans it was almost variably associated with tropical cyclogenesis. The patterns favorable for cyclogenesis are nsistent with other features of tropical cyclones such as the high tropospheric anticyclonic dy found in the Southern Hemisphere to the left of the path of the cyclone. Tropical cyclones pear to follow the motion of the high level divergence region which started the storm. When e high level divergence field is destroyed the divergence of the a-gradient components due the vertical velocity and vertical wind shear may be sufficient to maintain a mature cyclone. high level situation, additional to those already recognised as preventing recurvature, is alyzed, using 200 mb charts and other presentations. The effect of the passage of a cyclone om seas of uniform surface temperature on the transformation of a tropical cyclone to one th extratropical characteristics is discussed. A comparison of this effect in Australian ters with that in Northern Hemisphere regions of tropical cyclogenesis indicates that cyclones ay remain warm cored much further from the equator in the Northern Hemisphere than they in Australian waters. Some similarities and differences in tropical and extratropical cyclo-nesis are discussed briefly. *Subject Headings:* **1. Tropical cyclone formation 2. Tropical clone development 3. Cyclogenesis 4. Austria.**—*Author's abstract.*

9.7–173 551.515.21:551.501.8

Osmun, William G., **Anatomy of a hurricane.** *Aviation Age*, N. Y., 26(2):176–181, Aug. 56. figs. **DLC**—Structure of a hurricane, as depicted by ground based radar, is discussed m a pilot's point of view. Several interesting hurricane formations are shown by means radar-scope photos. *Subject Headings:* **1. Hurricane structure 2. Radar hurricane photo-phs.**—*M.R.*

9.7–174 551.515.23

Brooks, Edward Morgan et al., **Investigation of the behavior of storm tracks over ex-ded time periods.** St. Louis Univ., Institute of Geophysical Technology, Contract AF (604):1294, Final Report, **1956?** 25 p. 19 tables, refs. **DWB** (M15.23 B873in)—From daily Northern Hemisphere Historical Series of sea-level and 500 mb charts for 1949, 1950

and 1951, properties of pressure systems are treated statistically. The data covers periodicities in sea level pressure, intensity of cyclones, direction and speed of motion of centers, duration, number of cyclones, their geographic distribution, daily number of anticyclones, and properties of 500 mb systems such as contour types, cyclones, anticyclones, troughs and ridges. Relationships of surface pressure systems to 500 mb, and tropopause surfaces are analyzed. *Subject Headings:* **1. Cyclone tracks 2. Pressure periodicities 3. Anticyclones 4. Northern Hemisphere Historical Maps.**—*G.T.*

9.7–175 551.515.3(47)

Berenbeim, D. IA. and Gal'tsov, A. P. (*Geog. Inst. Acad. Sci. U.S.S.R.*), **Redkii smerch.** [Rare waterspout]. *Priroda*, 45(8):113, Aug. **1956.** fig. **DLC**—A description of a waterspout observed on Sept. 4, 1955 at 0705 o'clock (a tornado with a vertical cloud) observed in Goluba Bay near Gelendzhik. Gradually the trunk of the waterspout descended below the level of the mountains but then extended upward and the lower part of the cloud disappeared. A photograph of the waterspout is reproduced. *Subject Headings:* **1. Waterspout observation 2. Gelendzhik, U.S.S.R.**—*I.L.D.*

9.7–176 551.515.3

Hille, Alfréd, **Felhőtölcsér a ferihegyi repülőtéren 1955. július 14-én.** [Funnel cloud at the Ferihegy airport on July 14, 1955.] *Időjárás*, Budapest, 59(5):306–308, Sept./Oct. **1955.** 2 figs. **DLC**—Records obtained with a Fuess universal wind recorder and a barograph during the passage of a small tornado over Ferihegy (Budapest) airport are presented and discussed. The most salient features on the records are a complete turn in wind direction, a gust of 123 km/h and a 2.8 mm drop followed by a 3.2 mm rise in pressure. Visibility was completely obliterated by torrential rain. *Subject Headings:* **1. Tornado data 2. Tornado clouds 3. Ferihegy Airport, Budapest.**—*G.T.*

9.7–177 551.515.3(94)

§Vollprecht, R., **Dwellingup storm, June 1954.** *Australian Meteorological Magazine*, Melbourne, No. 9:61–66, June **1955.** 4 figs. **DWB**—The behavior of the storm that struck the Jarrah Forest at the top of the Darling Scarp on the night of June 16, 1954 and the damage that it caused are discussed. The synoptic situation at a time of its occurrence is analyzed and evidence is presented that the storm was a true tornado. *Subject Headings:* **1. Tornadoes 2. Synoptic conditions for tornadoes 3. Darling Scarp, Australia.**—*I.L.D.*

9.7–178 551.515.3:312.26(73)

The death toll from tornadoes. *Metropolitan Life Insurance Company, N. Y., Statistical Bulletin*, 37:8–10, March **1956.** fig., 2 tables. **DLC**—Loss of life from tornadoes in 1953 was highest in years (516) yet loss of life in 1946–55 decade was lowest (1766) in 40 years, being little over half of that in 1916–25. Variability in tornado activity is revealed by statistics. New England had 93 deaths in 10 years, 90 in one tornado (in 1953). Texas had 146 tornado deaths in 1953 and none in 1952. *Subject Headings:* **1. Tornado deaths 2. United States.**—*M.R.*

9.7–179 551.515.3

Grimes, Clayton C., **Waterspouts are rip snorters!** *Yachting*, N. Y., 100(2):58–59, 107–108, Aug. **1956.** fig., photo. **DWB**—A personal experience in a waterspout is described and the probable trajectory and wind motion within the spout shown on a diagram. The spout occurred just off Isleta Tropiche adjacent to Pedro Gonzalez in the Perlas Islands, 75 mi S.E. of Balboa, Canal Zone. It hit the launch occupied by the author and his wife about 10 p.m. The boat was deluged with water and battered by the wind as it lay fastened to a line in a cove. The waterspout circulation seemed to be clockwise and the tide was very high before the eye of the spout passed. Torrential rain occurred both before and after the eye. Three types of spouts are noted—weak, tornado-like, and super spouts, the latter occurring in hurricanes. *Subject Headings:* **1. Waterspout observation 2. Perlas Islands.**—*M.R.*

9.7–180 551.515.31:551.578.7

Hitschfeld, W. and Marshall, J. S., **A possible role of hail in the formation of tornadoes.** Gill Univ. Macdonald Physics Laboratory. Stormy Weather Research Group, Contract 19(122)-217, Scientific Report NW-25, March **1957.** 22 p. figs., 18 refs., eqs. **DWB**—nodest amount of hail falling through an air-mass, hot near the surface and dry aloft, is wn to produce temperature drops of several degrees in a matter of minutes. The hypothesis roduced that the resulting pressure drop leads to an inflow of air from the environment, n a wind pattern which can be described as a combination of vorticity and convergence. s pattern is taken to be that of the tornado. The energy obtainable from this chilled column ir is shown to be of the same order as the energy of the tornado whose pressure pattern observed by LEWIS and PERKINS (1953). In the Appendix, the temperature of precipita- particles falling through the atmosphere is shown to approach a definite temperature, er than the ambient wet-bulb temperature by a lag, $\Delta\theta_\infty$, with a relaxation time t. Values hese quantities are estimated. *Subject Headings:* **1. Tornado formation 2. Hail-tornado tionships 3. Temperature drop.**—*Authors' abstract.*

9.7–181 551.515.31:551.511

Matsumoto, S. (*Met. Res. Inst., Tokyo*), **A kinematical method to compute the steering city of a typhoon.** *Meteorological Society of Japan, Journal*, Ser. 2, 34(1):1–10, March 6. 7 figs., 4 tables, 4 refs., 25 eqs. **DWB, DLC**—The moving velocity of the center of a ular vortex is computed by applying the kinematical method on the solution of barotropic ticity equation derived by THOMPSON (1954). The steering velocity is expressed in a form weighted mean of averaged geostrophic wind. This method is also applicable for the oclinic field both of general current and of typhoon. The baroclinic structure of typhoon rather small effect on its movement. *Subject Headings:* **1. Kinematic vortex theory Barotropic vorticity equation 3. Steering of typhoons.**—*Author's abstract.*

9.7–182 551.515.4(541)

Choudhury, A. K. (*Met. Office, Gauhati*), **A severe thundersquall at Gauhati on 17 March 5.** *Indian Journal of Meteorology and Geophysics*, 7(3):319–321, July **1956.** 2+ figs., , eqs. **DWB**—A thunder squall with wind up to 66 mph raised havoc at Gauhati Airport March 17, 1955 at 1815 GMT. Calculations of convergence changes indicated that the ion was in an area of increasing convergence. Vertical velocities and rainfall rates at Dum m (radiosonde 1500 GMT March 17) indicate upward velocities of 59 cm/sec, corresponding 24.6 m/hr of rainfall, which is 3–6 times those found in usual active depressions. This ws "tremendous lifting triggered by local instability and possibly also by orography." *ject Headings:* **1. Thunder squall, Gauhati, India (March 17, 1955) 2. Vertical velocities ing thundersqualls 3. Convergence calculations 4. Gauhati, India.**—*M.R.*

9.7–183 551.515.4(548)

Joseph, K. D. (*Met. Off., Santacruz Airport, Bombay*), **Use of stability index for thunder- m forecasting at Madras.** *Indian Journal of Meteorology and Geophysics*, Delhi, 8(3):345, **1957.** table, ref. **DWB, DLC**—A test of the SHOWALTER (1953) Stability Index has n made at Madras for the years 1952–4, using radiosonde ascents made at 1500 GMT, and rds of thunderstorms or lightning observed at Meenambakkam for the same period. It is wn that the percentage possibility of a thunderstorm (for 501 cases) when the stability ex (S) was equal to the given values is as follows:

S	−4,	−3,	−2,	−1,	0,	1,	2,	3,	4
%	67	54	62	52	38	13	26	21	7

s, a quick and fairly reliable aid for objective thunderstorm forecasting can be used when- radiosonde ascents are available. *Subject Headings:* **1. Showalter's Stability Index Thunderstorm forecasting 3. Objective thunderstorm forecasting 4. Madras, India.** *I.R.*

9.7–184 551.515.81:551.507.3

*Berson, F. A. (*Div. of Met. Physics, C.S.I.R.O., Melbourne, Australia*), **Some measur ments on undercutting cold air.** *Royal Meteorological Society, Quarterly Journal*, 84(359):1–1 Jan. **1958.** 8 figs., 3 tables, 17 refs., 4 eqs. **DWB, DLC**—A detailed study is made of t structure of the nose of an undercutting cold front in southern Australia during summer, a of the strength of the flow beneath the wind shear layer. Serial pilot balloon ascents we made at Aspendale and at various places in the S.W. Victoria, S. Australia region duri summers of 1953–54, and 1954–55 (and two theodolite measurements at Penola) in a sect where a fairly close network of self-recording instruments is maintained. From the observ data the height of the top of the shear layer above the ground was determined and is sho on a graph with respect to wind direction. Accompanying surface changes, the friction he which attends the advancing mass of cold air, the character of inflow, circulation and entrai ment are discussed and illustrated by detailed charts and graphs prepared from the serial pil or surface records. The classical frontal model is shown to be inadequate. The picture complicated by turbulence, shear friction, surges and diurnal (sea breeze) effects. Vertic velocities are computed for one case and it is shown that the excess inflow (over the theoretica is connected with vertical mass transfer upward across the shear zone. *Subject Heading* **1. Cold front structure 2. Serial pilot balloon ascents 3. Mesometeorological networ 4. Aspendale, Victoria 5. South Australia.**—*M.R.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Aurora and airglow investigations** (Chapman), 9.7–38; **Actinometric observations, Italy** (De Pasquale), 9.7–43; **Radiative properties of glass** (Gardner), 9.7–59; **Radiation data and diagrams, Europe** (Collmann), 9.7–98; **Global radiation data, Sollia, Norway,** 9.7–111; **Ionospheric observations and solar eclipse, Belgian Congo** (Bonnet), 9.7–156; **Stratospheric temperature variations** (Chiu), 9.7–199; **Elec. excitation of auroras** (Chamberlain), 9.7–277.

9.7–185 551.521:551.510.5

Kato, Susumu (*Geoph. Inst., Kyoto Univ.*), **On the solar Lyman beta radiation and t ionosphere.** *Journal of Geomagnetism and Geoelectricity*, Kyoto, 6(3):153–156, Sept. 195 fig., 6 refs., eqs. **DLC**—Splitting of Lyman β radiation into two scattered radiations whi are absorbed by atomic oxygen, which in turn absorbs visible radiation and emits infrare occurs to a greater degree at lower temperatures than at the high temps. of the F2 regio Processes whereby incident Lyman β radiation from the sun may be nearly changed into radiation in the E and F1 regions (L^{β} radiation may be observed in the F2 region) are s forth. Molecular nitrogen does not play an important part in the processes. The fir successful observation of Lα was reported in 1953 by W. B. Pietenpol and others. *Subj Headings:* **1. Lyman beta radiation splitting 2. Photochemistry of ionosphere 3. Lyman alp radiation in ionosphere.**—*M.R.*

9.7–186 551.521.11:551.521.12(67

*Glover, J. and McCulloch, J. S. G. (*both, East African Agriculture and Forestry Res. Orga Muguga, Kenya*), **The empirical relation between solar radiation and hours of bright sunshi in the high-altitude tropics.** *Royal Meteorological Society, Quarterly Journal*, 84(359):56–6 Jan. **1958.** 2 figs., 3 tables, 9 refs., 9 eqs. **DWB, DLC**—The relationship between total sol radiation on a horizontal surface (Q) as measured by a pyranometer, and hours of brig sunshine (n) as measured by a Campbell-Stokes recorder, has been examined and it is sho that there is little practical gain in weighting the hourly sunshine records by the sine of t apparent solar altitude. In the non-dimensional equation

$$Q/Q_A = a + bn/N$$

values of a and b derived from daily records are shown to vary widely from month to mon but their distribution appears to be substantially normal. Actual mean values of a and

a five-year period (1938–1943) at Kabete, Kenya (altitude 6000 ft) differed slightly but significantly according to the length of period in which the data were grouped, the slope he equation increasing with increased smoothing. The sum of a and b has been shown to be roximately constant ($\cong 0.82$) at Kabete, where the optical air mass varies little throughout year. For checking the consistency of the data from various parts of the world, it is ntial to reduce the differing apparent transmission coefficients to standard measure. In ctice, a simple correction to optical air-mass unity has proved adequate for the records ilable at this station. *Subject Headings:* **1. Solar radiation-sunshine duration relationships Kabete, Kenya.**—*Authors' abstract.*

9.7–187 551.521.18:553.62

Bell, Ely E. and Eisner, Leonard (*both, Dept. Physics and Astronomy, Ohio State Univ., umbus*), **Infrared radiation from the white sands at White Sands National Monument, w Mexico.** *Optical Society of America, Journal*, 46(4):303–304, April **1956.** fig., ref. **/B, DLC**—A mobile spectrographic laboratory was built to study the infrared radiation n the sky and from the ground. A modified Farrand double monochromator with KBr ics covering the 1.5 to 25μ range was installed to obtain the ratio between radiance of test rce and that of a reference black body near ambient temperature. Spectra were made of the and sand at White Sands, N. Mex. Sample spectra of clear sky and white sands at 1730 l 1800 h on Aug. 13, 1955 are presented. Envelopes of both spectra agree with that for ck body at 30°C—the current temperature. Sky radiation was produced by water vapor 6μ and 16–20μ region, CO_2 in 15μ and O_3 in 10μ region. Radiation from sand shows a imum at about 9μ not observed elsewhere. Sand was nearly pure gypsum ($CaSO_4 \cdot 2H_2O$). ission from samples of this sand were measured at Columbus, Ohio in the laboratory and nd to have a strong reflectivity at 8.75μ. Thus it is concluded that the minimum near 9μ White Sands is due to reststrahlen of gypsum sand (emissivity is increased). Measurements O_3 do not appear to be disturbed by the reststrahlen of the gypsum sand. *Subject Headings:* **Infrared radiation from white sand 2. Reststrahlen 3. White Sands, New Mex.**—*M.R.*

9.7–188 535.33:551.521.18

Iudalevich, F. F. (*Geophys. Inst., Acad. Sciences USSR*), **O mnogokratnom rasseianii v rakrasnoĭ oblasti spektra.** [Multiple scattering in the infrared region of the spectrum.] *ademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 7:862–864, July **1956.** 3 tables, 4 refs., eqs. **DLC.** Trans. into English by E. R. Hope, issued as *Canada. Defence Research ard*, T-239-R, Jan. **1957.** 3 p. This trans. available Special Libraries Association Transla- n Center as its NRC-2285.—With the aid of the approximate equation

$$\frac{(I_{MH}/I_I)\lambda=\lambda_1}{(I_{MH}/I_I)\lambda=\lambda_2} \approx \left(\frac{\lambda_2}{\lambda_1}\right)^4$$

—of total intensity of multiple dispersion, I_I and I_{II} intensity of primary dispersion and ondary dispersion of light, respectively) the author constructs a table of I_{II}/I_I for an nosphere with a large amount of multiple dispersion for 6000 Å $\leqslant \lambda \leqslant$ 10,000 Å. The ratio /I for the infrared region was found to be considerably less than for the visible region. The per limit of I_M/I can be obtained as the sum of an infinite geometric progression. Data are sented showing that even in the near infrared the effect of multiple diffusion is small, hence servations in the infrared eliminate the effect of multiple scattering in solving problems of nospheric optics. *Subject Headings:* **1. Infrared spectra 2. Infrared scattering.**—*I.L.D.*

9.7–189 551.521.18:551.593.5

Kagan, R. L. and Iudin, M. I. (*Main Geophysical Obs. U.S.S.R.*), **Priblizhennoe reshenie vneniia rasseianiia sveta.** [An approximated solution of the equation of the scattering ight.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.* No. 8:968–975, Aug. **1956.** 6 tables, refs., 17 eqs. **DWB, DLC**—An investigation of the problem of light scattering in a plane er illuminated from above by a parallel bundle of rays and from below by a finite underlying face with a known albedo. The simplified method developed is used to calculate the scatter-

ing and extinction of shortwave radiation in a turbid medium in the case of spherical scatterin coefficients (also in the case of non-spherical scattering coefficients possessing a central sym metry). It yields results sufficiently close to a precise solution, especially at the boundary of layer. The exactness of these results in the case of small optical thicknesses is much greate than that of the method of SCHWARZSCHILD and EDINGTON. *Subject Headings:* **1. Scatterin of light 2. Scattering coeffcient.**—*I.L.D. and Author's abstract.*

9.7–190 551.521.18:551.521.3

Murcray, David G., **Study of the near infrared solar and terrestrial radiation as a functio of altitude above the earth's surface.** Denver. Univ. Dept. of Physics, Contract AF 19(604) 1005, Final Report, Feb. 28, **1957.** 10 p. **DWB** (M21.61 M973s)—This report summarize the results obtained in an experimental study of the absorption of infrared solar radiation b the atmosphere and its variation with atmospheric conditions and altitude. In this study th emphasis is on altitude variation investigated by use of a balloon-borne spectrometer. Th detailed results of these flights are reported in *Scientific Report*, No. 1. Other studies includ a determination of atmospheric absorption coefficients for the windows between the wate vapor absorption bands, the transmission of clouds and reflectivity of metal films. *Subje Headings:* **1. Infrared absorption 2. Altitude effects on infrared radiation.**—*Author's abstrac*

9.7–191 551.521.18:535.33:551.508.

Sloan, Raymond William, **The infrared emission spectrum of the atmosphere.** Ohi State Univ. Research Foundation, Contract AF 19(604)-1003, Scientific Report No. 3, Marc **1956.** 195 p. 144 figs., 6 tables, 13 refs., 23 eqs. **DWB**—An instrument for measuring sk radiation was developed, and data on sky radiation in wavelengths from 4μ to 15.5μ obtaine during 1954 analyzed and presented in numerous tables and graphs. The equipment describe measures the emission spectrum of the earth's atmosphere and compares it with that of blackbody at the temp. of liquid nitrogen and at atmospheric pressure. Calibration for 0°C 20°C and 50°C blackbody temperatures was made and values for radiation calibration pa rameter found to be within $\pm 2\%$ agreement for spectral regions far from fundamental band of CO_2 and H_2O. Spectra for various air masses, states of sky, zenith distance, temp. an absolute humidity are compared and discussed. (*See* 7.2–158, Feb. 1956, *MAB*, for a 6 p article, same title, giving condensed results.) *Subject Headings:* **1. Emission spectra 2. Infra red radiation instruments 3. Sky radiation.**—*M.R.*

9.7–192 551.521.326:535.3

Robley, Robert (*Observatoire du Pic du Midi*), **Variation annuelle de la lumière du cie nocturne dans le bleu par spectrophotométrie photographique.** [Annual variation of the ligh of the night sky in the blue by photographic spectrophotometry.] *Annales de Géophysiqu* Paris, 13(3):222–230, **1957.** 5 figs., table, 6 refs. English summary p. 222. **DLC**—Spectro photometric research on the airglow in the range 4000 A–4500 A is reported. The intensit of the main bands 4420 A, 4170 A, 4070 A shows 2 maxima in May and Oct. The absence c a close correlation between the intensity of the bands and that of the background, suggest that a real continuum is present. *Subject Heading:* **1. Night airglow spectrum.**—*Author' abstract.*

9.7–193 551.521.6:521.6

Newkirk, G. S., **Doppler motions in the corona.** *Annales d'Astrophysique*, Paris, 20(3) 127–141, **1957.** 7 figs., 5 eqs., 16 ref. **DWB**—Doppler motions in the corona over 24 activ regions have been measured in detail. The coronal Doppler features coincide with activ loop prominences in which the Yellow coronal line (5694 A) is observed. The velocities c the coronal material are, in general, of smaller magnitude but of the same sign as those of th associated prominence. A model of the motions is developed to explain the statistical velocit distributions. The analysis indicates that expansion or contraction of the magnetic fiel defining the loop gives rise to the Doppler features. Apparently, the coronal material move much slower along the magnetic lines of force than does the hydrogen. *Subject Heading* **1. Sun's corona.**—*Author's abstract.*

9.7–194 551.521.6

Rudkjobing, G., **The solar photospheric emission lines inside *H* and *K*.** *Annales d'Astrophysique*, Paris, 20(3):137–138, **1957.** 4 refs. **DWB, DLC**—Emission lines found inside and *K* at the edge of the sun are interpreted as true absorption lines, the background intensities being lower than corresponding to the surface temperature due to the occurrence of scattering in the strong lines. *Subject Heading:* **1. Solar spectrum.**—*Author's abstract.*

TEMPERATURE

See also: **Cold waves and damage to crops, Belgium** (Vandenplas), 9.7–81; **Frost damage to winter crops, Belgium** (Vandenplas), 9.7–82; **Barn climates and temperatures** (La Rock, Yeck), 9.7–85; **Temp. and wind microoscillations** (Krechmer), 9.7–121; **Radiation error of radiosondes** (Rossi), 9.7–126.

9.7–195 551.524.37

*Hader, Fritz, **Klimazahlen zur Beurteilung der alpinen Frostverwitterung.** [Climatic index for the distribution of Alpine frost weathering.] *Geographische Gesellschaft, Vienna, Mitteilungen*, 97(1):26–34, **1955.** 10 tables, 14 refs. **DLC**—The seasonal and height variations in the number of frost-change days (days with freezing and thawing) on different slopes in the Austrian-Swiss Alps (heights 250 m to 3200 m) are tabulated and discussed in connection with air and soil temperatures, cloudiness, ground freezing, frost weathering of rocks, etc. The number of "frostwechseltage" per year is greatest at about 1000–1500 m. At higher and lower elevations it decreases—at higher because it freezes continually more of the time and at lower for the opposite reason. *Subject Headings:* **1. Frost weathering 2. Freezing and thawing days 3. Alps.**—*M.R.*

9.7–196 551.524.37

Maksimov, S. A., **Zimnie kholoda.** [Cold temperatures in winter.] *Priroda*, Moscow, (1):125, Jan. **1957. DWB, DLC**—Popular description of atmospheric processes leading to periods of extreme cold weather and of resulting damages to plants. *Subject Headings:* **1. Cold spells 2. Extreme temperatures 3. U.S.S.R.**—*A.A.*

9.7–197 551.524.37(73)

Sagendorph, Robb (*ed., Old Farmer's Almanac*), **About-winter.** *New York Times Magazine*, Sec. 6:16, Dec. 16, **1956.** 2 photos. **DLC**—A popular article on extreme winter weather conditions (cold, ice, snow) in various parts of the earth. Cold winters in the U. S. are listed chronologically. *Subject Headings:* **1. Severe winters 2. United States.**—*M.R.*

9.7–198 551.524.4:551.510.62(524)

Sapporo District, Japan. Central Meteorological Observatory, **On the lower temperature inversion layer and the curvature of microwave propagation at Sapporo.** *Journal of Meteorological Research*, Tokyo, 9(8):575–582, Aug. **1957.** 5 figs., 9 tables, 7 refs., 7 eqs. **DWB**—The lower temperature inversion layer has an important role for the propagation of microwaves. In this report, some statistical features of the inversion layer at Sapporo during 1952 and 1953 are examined, that is: (1) height of the bottom of the layer, (2) height of the top of the layer, (3) thickness of the layer, (4) temperature difference between the bottom and the top of the layer, etc. Next, the curvature of microwave propagation in the inversion layer is examined by use of radiosonde data. *Subject Headings:* **1. Inversion effects on microwave propagation 2. Inversion heights 3. Sapporo, Japan.**—*Author's abstract.*

9.7–199 551.524.7:551.510.53:551.521

*Chiu, Wan-cheng, **The diurnal temperature variation of the stratosphere due to radiative processes.** N. Y. Univ. College of Engineering. Research Div. Dept. of Met. and Oceanography, Contract AF 19(604)-1755, Sept. **1957.** 38 p. 5 figs., 11 tables, 17 refs., 7 eqs. **DWB** (M57.2 N532sr)—From about five years (1952–1956) of radiosonde data over the U. S., taken by fifteen radiosonde stations that had been conducting four observations a day, the

mean temperatures at the four observational hrs were obtained separately for winter and summer at the 200 mb, 150 mb, 100 mb, and 50 mb levels of the stratosphere. At each season and level (except the 50 mb level in winter), a diurnal temperature trend that would have resulted from the radiative processes alone (including absorption and emission of heat energy) was detected by combining the information for all the stations together. After the factors and observational errors that might threaten the success of this detection were carefully examined and discounted, the order of magnitude of the diurnal temperature variation due to radiative processes was given. *Subject Headings:* **1. Stratospheric temperature variations 2. Stratospheric radiation 3. United States.**—*Author's abstract.*

9.7–200 551.524.7:551.547.3(52)

Mukai, M., **Variability of temperature and pressure in the free atmosphere along 140°E.** *Journal of Meteorological Research*, Tokyo, 9(1):45–50, March **1957.** 13 figs., 2 tables, 2 refs. In Japanese, English summary p. 45. **DWB, DLC**—The author examined the variability of temperature and pressure (at 1200 I) in the free atmosphere along 140°E by making use of Aerological Data of Japan published by the Central Meteorological Observatory, Japan in 1952–1954. First the monthly cross-sections of the standard deviation of temperature and pressure in the free atmosphere along 140°E were made and these characteristic features were pointed out: (1) there are two maximum points of the standard deviation of temperature in the free atmosphere along 140°E, one being in the upper troposphere and the other in the lower troposphere, (2) the position of the maximum point shows seasonal variation. *Subject Headings:* **1. Temperature variability 2. Pressure variability 3. Japan.**—*Author's abstract.*

9.7–201 551.524.7

Nicolet, M., **Température à la limite de la thermosphère.** [Temperature at the limit of the thermosphere.] *Académie Royale de Belgique, Brussels, Classe des Sciences, Bulletin*, 5th Ser., 63(10):731–739, Oct. **1957.** 2 tables, 7 refs., 18 eqs. **DLC**—A steady conductive heat flow in the thermosphere with a temperature of 2250°K at the critical level implies a flux of coronal energy actually trapped by the earth's atmosphere of the order of 0.7 erg cm^{-2} sec^{-1}. *Subject Headings:* **1. Temperature in the thermosphere 2. Outer atmosphere temperature.**—*A.V.*

SOIL TEMPERATURE

9.7–202 551.525.4:550.361

Dergunov, I. D., **O neobychnoĭ termicheskoĭ anomalii na poberezh'e Chernogo Moria.** [An unusual thermal anomaly on the shores of the Black Sea.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 10:1219–1223, **1956.** 2 figs., 4 refs., eq. **DLC**—The author reviews briefly some data on the increase of temperature and heat with depth in the earth's crust in various parts of the world and then discusses various observations on temperature change and depth made in the Sochi and Matsesta districts near the Black Sea. Temperatures were measured with an electric thermometer having a precision up to 0.01°C. Both the geothermal gradient and the geothermal degree were unusual. In Sochi the geothermal degree is usually 25 m/°C. Five different geothermal types were observed, ranging from 17.78 m/°C to 74.63 m/°C. The geological structures associated with the different geothermal degrees are discussed. *Subject Headings:* **1. Geothermal anomalies 2. Black Sea Coast.**—*I.L.D.*

9.7–203 551.525.4:525.5:551.582.2

Vandenplas, A., **La propagation du gel dans le sol à Uccle-Bruxelles.** [Frost penetration into the soil at Uccle-Brussels.] *Revue de l'Agriculture*, Brussels, 10(6):1–2, June **1957.** 8 figs., 2 tables, 9 refs. **DA**—Study of frost penetration into a sandy clay soil with a large proportion of clay, in the course of a frost period during which the ground was never covered with snow. The frost penetrates the soil at an average rate of the order of 5 cm a day and sometimes can reach a rate of propagation of 15 cm in 24 hrs. The depth reached by the frost depends on the soil cover; in uncompressed bare soil, frost can reach a depth of 50 cm, in soil covered with grass 20–30 cm, and in compressed soil (streets, dirt roads, etc.) 80–90 cm. *Subject Headings:* **1. Frost penetration in soil 2. Soil temperature data 3. Belgium.**—*A.V.*

PRESSURE AND WIND

PRESSURE

See also: **Coriolis effects on currents** (Kosiba), 9.7–52; **Temp. and pressure variability, Japan** (Mukai), 9.7–200.

9.7–204 551.543:525.6(443.661)

Rougerie, Paul, **La marée barométrique à Paris.** [The atmospheric tide at Paris.] *nnales de Géophysique*, Paris, 13(3):203–210, **1957.** 4 figs., 3 tables, 10 refs., eqs. English ummary p. 203. **DLC**—The semi-diurnal lunar wave L_2 and the principal solar waves S_1, $_2$, S_3 and S_4 are deduced from 36 yrs of barometric observations made at the Parc Saint-Maur bservatory. The characteristics of the diurnal variation of the atmospheric pressure and f its modification with the seasons are described. The results are compared with those found t the neighboring European stations. *Subject Headings:* **1. Atmospheric tides 2. Pressure ata 3. Paris.**—*Author's abstract.*

WIND

See: **Winds, clouds and storms** (Bessemoulin, Clausse), 9.7–12.

GUSTINESS AND TURBULENCE

See also: **Aerodynamic turbulence seminars** (NATO), 9.7–3; **Temp. and wind micro-oscillations** (Krechmer), 9.7–121; **Smoke plume height prediction, Aspendale, Victoria** (Ball), 9.7–148.

9.7–205 551.551:551.43:551.509.67

Kassander, A. Richard, Jr., **Study of the trajectories and diffusion patterns of ground-enerated airborne particulates under orographic wind flow conditions.** *Arizona. Univ. nstitute of Atmospheric Physics, Scientific Report*, No. 5, May 15, **1957.** 16 p. 19 figs. (incl. hotos). **DWB** (M08.21 A719s)—In late June and early July, 1956, a series of experiments ere performed in the Rincon Valley 20 mi SE of Tucson, Ariz., to determine the wind structure ver an orographic barrier and to ascertain whether ground-generated aerosols reach cloud eights in such a situation. Zinc sulfide particles were dispersed in an oil fog from a ground-ocated fog generator and collections were made using airborne impactors. Particles were ound at elevations of at least 14,000 ft at distances out to at least 20 mi. However, "plumes" ere found to be considerably broader than had been anticipated and the structure of the wind ver a mountain ridge is judged to be substantially more complex than has been assumed in loud-seeding operations. *Subject Headings:* **1. Air flow over mountains 2. Orographic iffusion patterns 3. Cloud seeding techniques. I. Contract NSF G1101.**—*Author's abstract.*

WIND DISTRIBUTION AND VARIATIONS

See also: **Coriolis effects on currents** (Kosiba), 9.7–52.

9.7–206 551.553.21:001

†Khromov, S. P., **Mussony v obshcheĭ tsirkuliatsii atmosfery.** [Monsoons in general tmospheric circulation.] (In: Budyko, M. I. (*ed.*), **A. I. Voeĭkov i sovremennye problemy limatologii.** Leningrad, **1956.** p. 84–108. fig., 52 refs.) **DWB**—On the basis of the latest vailable data, the author presents a comprehensive discussion of the problem of the precise efinition of the concept of monsoon, the role of monsoons in the general circulation and the eographic distribution of monsoons. Beginning with VOEĬKOV's pioneer work on the classical ndian monsoon, the author reviews critically the most recent studies on the monsoon problem i general. *Subject Headings:* **1. Monsoon circulation 2. Definitions.**—*I.L.D.*

9.7–207 551.553.8:551.515.2

*Myers, Vance A. (*Hydromet. Sec., U. S. W. B., Wash., D. C.*), **Maximum hurricane winds.** *merican Meteorological Society, Bulletin*, 38(4):227–228, April **1957.** 3 tables, 5 refs., 6 eqs.

DWB—A discussion of relation (Km) between maximum wind speed (in knots) in hurricanes (Vm) and pressure difference ($P_n - P_o$) between center and rim of hurricane. The effect of surface roughness at Brookhaven, compared with Lake Okeechobee, Fla., is shown in tables giving values of Km for different times and heights above ground. Comments on methods and data are included. *Subject Headings:* **1. Hurricane wind maxima 2. Pressure-wind relationships in hurricanes 3. Roughness influence on hurricane winds 4. Brookhaven, N. Y. 5. Lake Okeechobee, Fla.**—*M.R.*

WIND EFECTS

9.7–208 551.556:551.481.1

†*Siren, Allan, **On computing the land uplift from the lake water level records in Finland.** *Fennia*, Helsinki, 73(5), **1951.** 181 p. 37 figs., 68 tables, 25 refs. **DLC** (G23.G4)—Effect of wind and atmospheric pressure on water level is considered, in Sect. III (p. 13–26) of this monograph, for numerous lakes in Finland. Direction of wind and duration of wind as well as wind speed effects are considered in great detail, with ample illustrations and data in graphic and tabular forms. Methods of computation of wind corrections are also cited. Effect of discharge on water level is taken up in Sec. IV (p. 26–31) and applications to different lake basins in Sec. V (p. 31–84). In one case data analyzed go back to 1900 and another to 1912 (through 1948). *Subject Headings:* **1. Lake level computations 2. Wind effects on lake levels 3. Land uplift calculations 4. Finland.**—*M.R.*

UPPER AIR WIND

See also: **Jet stream atlas** (Serebreny et al.), 9.7–32; **Transosonde data, Oppama, Japan** (Mastenbrook), 9.7–112; **Advection of relative isohypses** (Doumont), 9.7–159; **Aerological cross sections and mean circulation diagrams** (Vuorela), 9.7–161; **Jet stream analysis, Japan** (Mohri), 9.7–163; **Jet stream variations** (Yamada), 9.7–164.

9.7–209 551.557.2

Lloyd, S. H. (*Central Office, Melbourne*), **A preliminary evaluation of streamline analysis.** *Australian Meteorological Magazine*, Melbourne, No. 15:1–11, Dec. **1956.** 5 figs., 1 ref. **DWB**—Duty forecasters at each of six tropical stations, drew a series of ten 5000 ft streamline patterns at 12 hourly intervals commencing at 1600 GMT on 20 May, 1956. Each of these charts has been compared with the corresponding chart drawn by an analyst of Central Analysis Section, and some attempt made to assess the feasibility of drawing 5000 ft streamlines with reasonably objectivity with the network limitations of the Australian and adjacent Asiatic regions. Salient features on each of the ten charts are discussed, and some general remarks on the Bjerknes-Sandstrom technique for representing air flow are included. It is concluded that the wind network at 5000 ft is sufficient for a reasonable presentation of streamline patterns, although there are serious deficiencies away from the mainland. Subjectivity in drawing of patterns, though initially high, tends to decrease as experience in the technique is gained. Further investigation into streamline techniques is worthwhile. *Subject Headings* **1. Streamline analysis 2. Australia.**—*Author's abstract.*

9.7–210 551.557.3

*Rein, František, **Vítr na Milešovce v letech 1946–1955.** [Wind at Milešovka, 1946–1955.] *Meteorologické Zprávy*, Prague, 10(2):36–41, **1957.** 3 figs., 7 tables, 3 refs. Russian and German summaries p. 36. **DWB**—Data on wind direction and force at Milešovka for each month of the period 1946–1955 are presented in tables and graphs and briefly discussed. *Subject Headings:* **1. Upper air wind variations 2. Mountain meteorology 3. Milešovka, Czechoslovakia.**—*Trans. of author's abstract.*

VERTICAL MOTION

See also: **Vertical current theory** (Mertsalov), 9.7–158.

9.7–211 551.558.1:551.553.11

Malkus, Joanne S. and Stern, Melvin E. (*Woods Hole, Mass.*), **[Comments on] R. C. Smith: Air motion over a heated land mass (and) reply by Smith.** *Royal Meteorological*

ociety, *Quarterly Journal*, 84(359):73–74, Jan. **1958.** 5 refs. **DWB, DLC**—MALKUS and TERN take exception to SMITH's (*see* 8.8–260, Aug. 1957, *MAB*) work in air motion over a eated land mass (an extension of work on convective motion in a stable air mass over heated nd, *see* 6.11–274, Nov. 1955, *MAB*) and SMITH takes exception to the exceptions in regard statement that heating by means of insolation and convection take a similar form in two fferent situations examined: 1) motion over a heated island at 09 h and 2) midday flow. It argued that the heating function is in phase with the rate of change of island temp. only the figure is >1. In the model (an island 200 km wide) the parameter is only 2/5, so maxi- um heating occurs near midday and not at 09 h as SMITH predicts. Also upward and not ownward motion occurs at low levels over a small island in the trades at midday and should so on 200 km wide islands. *Subject Headings:* **1. Air flow over heated land 2. Sea breeze rculation.**—*M.R.*

9.7–212 551.558.21:551.576.1:656.7

*†Corby, G. A., **Air flow over mountains: notes for forecasters and pilots.** *Great Britain. leteorological Office, Meteorological Report*, 3(18), **1956.** 53 p. 22 figs., 23 refs. **DWB**—A rief survey is first given of the observational evidence regarding special airflow effects in the eighborhood of mountains, as provided by the visual evidence of clouds, the experiences of ider pilots and effects noted by the pilots of powered aircraft. In the discussion of theoretical ork, mathematics has been avoided so far as possible, the emphasis being on the interpretation nd implications of theory. The application of this knowledge to aviation forecasting is onsidered in some detail with the aid of numerous actual examples of the experiences of pilots flying over mountainous terrain. Advice is given on the recognition of air streams favoring ie occurrence of waves to the lee of mountains and, to the extent that the present state of nowledge permits, on the prediction of the characteristics of any such waves. The effect of ountains in generating turbulence and in modifying the liability to aircraft icing is also onsidered. In the final section, some further information, which is intended specifically to ssist pilots, is given. *Subject Headings:* **1. Air flow over mountains 2. Lee waves 3. Pilot uides.**—*Author's abstract.*

9.7–213 551.558.21:551.43

Corby, G. A. and Sawyer, J. S. (*both, Met. Office, Dunstable*), **The air flow over a ridge: ie effects of the upper boundary and high level conditions.** *Royal Meteorological Society, uarterly Journal*, 84(359):25–37, Jan. **1958.** 4 figs., 18 refs., 25 eqs. **DWB, DLC**—The olution obtained by perturbation theory for the airflow over a ridge depends on the mathe- atical conditions imposed at the upper boundary of the region for which a solution is obtained. ew arguments are developed as to the choice of upper-boundary condition appropriate to the tmospheric problem; these lead to the solution already adopted by QUENEY (1947). In ertain airstreams it is possible for lee waves to have their largest amplitude in the upper roposphere and stratosphere. The character of the airstream at high levels plays a dominant art in determining the characteristics of these waves, but it has only negligible effects on the ore familiar type of lee wave which has its largest amplitude in the lower troposphere. (For bstract on same title from another source, *see* 8.8–261, Aug. 1957, *MAB*.) *Subject Heading:* **Air flow over mountains.**—*Authors' abstract.*

9.7–214 551.558.21

Wallington, C. E. and Portnall, Janet (*both, Met. Office, Dunstable*), **A numerical study of e wavelength and amplitude of lee waves.** *Royal Meteorological Society, Quarterly Journal*, 4(359):38–45, Jan. **1958.** 4 figs., table, 3 refs., 14 eqs. **DWB, DLC**—Wavelengths and ariation of wave amplitude with height are computed for 19 airstreams in which lee waves ave been observed. Comparison between the computed and observed wavelengths suggests at the tropospheric flow is sufficiently independent of conditions in the stratosphere to low reasonable latitude in making a boundary assumption at some high level. (For abstract same title from another source, *see* 8.11–202, Nov. 1957, *MAB*.) *Subject Heading:* **1. Lee aves.**—*Authors' abstract.*

AQUEOUS VAPOR, HYDROMETEORS AND HYDROMETEOROLOGY

HUMIDITY

See also: **Aerodynamic turbulence seminars** (NATO), 9.7–3.

9.7–215 551.571.1:551.571.31:551.509.314

Bultot, F., **La masse spécifique de l'air dans la cuvette centrale congolaise.** [Specific weight of air in the Central Congo Basin.] *Belgium. Académie Royale des Sciences Coloniales. Bulletin des Séances*, 3(4):956–962, **1957.** fig., table, 3 refs. **DLC**—The author studies the statistical characteristics (average value, mean value and interlapse of variation) of the hourly values of the specific weight of air in the Central Congo Basin. He remarks that the variation interval does not exceed 0.044 kg/m³, i.e., about 4% of the average and mean specific weights, whereas fluctuations of temperature and of barometric vapor pressures may reach 15°C and 10 mb, respectively. Referring to this fact, the mean daily and annual regimes can only have a very small amplitude. *Subject Headings:* **1. Specific weight of air 2. Belgian Congo.**—*A. V.*

9.7–216 551.571.7

*Rein, František, **Vlhkost vzduchu na Milešovce v letech 1946–1955.** [Atmospheric humidity at Milešovka, 1946–1955.] *Meteorologické Zprávy*, Prague, 10(1):13–16, **1957.** fig., 6 tables. Russian and German summaries p. 13. **DWB**—Data on relative humidity and vapor pressure at Milešovka (the observatory of the Czechoslovak Academy of Science) are presented for the decade 1946–1955. The results are briefly discussed. *Subject Headings:* **1. Upper air humidity 2. Relative humidity data 3. Mountain meteorology 4. Milešovka, Czechoslovakia.**—*Trans. of author's abstract.*

EVAPORATION AND EVAPOTRANSPIRATION

See: **Soil trafficability** (Thornthwaite et al.), 9.7–2; **Soil trafficability, Ohio and Maryland** (Thornthwaite, Mather), 9.7–246.

CONDENSATION

See also: **Raindrop size distribution and giant nonhygroscopic nuclei, Hokkaido, Japan** (Okita), 9.7–233.

9.7–217 551.574.1:551.509.617

Manson, James E. (*Atmos. Phys. Lab., Geophys. Res. Dir., Cambridge, Mass.*), **Ice nucleation and the structure of nuclei crystal faces.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** N. Y., Pergamon Press, **1957.** p. 360–368. 6 figs., 14 refs.) **DLC** (QC921.5.U5), **DWB**—The nucleating effectiveness of hexagonal and cubic silver iodide injected into supercooled water clouds has been found to be substantially the same. The effectiveness of two modifications of calcium carbonate, vaterite and calcite, has been found to differ widely, vaterite being effective and calcite not effective. A study of the structure of those faces prominently developed on the nuclei particles indicated that the crystallography of nuclei crystal faces is very important in determining effectiveness in seeding supercooled water clouds. *Subject Heading:* **1. Nuclei effectiveness.**—*Author's abstract.*

9.7–218 551.574.1

Woodcock, A. H. (*Woods Hole Oceanog. Inst., Mass.*), **Atmospheric salt in nuclei and in raindrops.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** N. Y., Pergamon Press, **1957.** p. 202–206. 2 figs., table, 5 refs.) **DLC** (QC921. 5. U5), **DWB**—The observed salinities of rainwater, the weights and salinities of raindrops, and the weights of sea-salt nuclei in the atmosphere in Hawaii are quantitatively

ated. It is shown that the weight of salt in the nuclei is adequate to supply the total salt served in the rains. Brief suggestions are made concerning the meaning of the above result terms of raindrop formation on the large salt nuclei. *Subject Headings:* **1. Saline nuclei Hawaii.**—*Author's abstract.*

9.7–219 551.574.1

Weickmann, Helmut (*Evans Signal Lab., Belmar, N. J.*), **Recent measurements of the rtical distribution of Aitken nuclei.** (In: Conference on the Physics of Cloud and Precipita- n Particles, Sept. 1955, **Proceedings.** N. Y., Pergamon Press, **1957.** p. 81–88. 13 figs.) LC (QC921.5.U5), **DWB**—The vertical distribution of Aitken nuclei was measured during ghts with a B-17 aircraft. The exchange layer of the lower atmosphere is clearly indicated a high concentration of nuclei which decreases suddenly at the top of this layer. *Subject eading:* **1. Nuclei vertical distribution.**—*Author's abstract.*

9.7–220 551.574.42

Honkala, Rudolf A., **The great ice storm, January 8–13.** *Mount Washington Observatory, rham, N. H., News Bulletin,* No. 29:3, April **1956.** 2 photos. **DWB.** Also in: *Weatherwise,* ston, 9(5):163–164, Oct. **1956.** 3 photos. **DWB**—Worst ice storm in history of station curred at Mt. Washington during week of Jan. 8–13, 1956. Winds reached 123 mph from E. on the 9th. Temp. ranged from 17° to 34°F. Clear blue ice built out 15–18 in. at ground d as much as 6 ft at upper edge of tower, and remained as late as March. One chunk rrounding a 6 ft pipe weighed about 900 lbs. Crew at observatory was frozen in for many urs. Only the wind vane and pitot tube could be kept clear of ice after the first day. amage was remarkably light since little of it fell off—it just stayed until melted. *Subject eadings:* **1. Ice storms 2. Mt. Washington, N. H.**—*M.R.*

9.7–221 551.574.7:551.507.321.2

Kitaoka, T.; Ooi, S. and Igarashi, T. (*all, Fujisan Weather Station*), **Experiments on the ing of radio-sonde balloon.** *Tateno, Japan. Aerological Observatory, Journal,* 6(1):55–61, n. **1957.** 7 figs., 16 plates, table, 16 refs. In Japanese; English summary p. 55. **DLC**—rced descents of radiosonde balloons from about 0°C level occur about twenty times every ar. These descents are considered to be due to icing. In order to avoid these icings, periments were carried out on the summit of Mount Fuji from Nov. 1952 to May 1953. 0 gr Latex balloons were attached to wood globe of 40 cm diameter, and exposed in wind of out 5 m/s and −10°C. The velocity of icing did not exceed 1 gr/min, but could be good ason of forced descents. Several deicing chemicals, namely Ethylenglycol, Gum-Terpen, licon and Sugiura's Solvent have been examined. These chemicals catch and solve the rime s and increase icing, and showed rather bad effects. We could not obtain good results and e experiment was suspended for financial reasons. Results shown in figures and photographs. *bject Heading:* **1. Icing of radiosonde balloons.**—*Authors' abstract.*

CLOUDS

See: **Winds, clouds and storms** (Bessemoulin, Clausse), 9.7–12; **Airflow over mts.** (Corby), 9.7–212.

PRECIPITATION

See also: **Rainfall duration depth-curves, Eastern U. S.** (Riedel et al.), 9.7–23; **Rainfall and hydrology, Georgia, U. S.** (Thomson et al.), 9.7–24; **Tropospheric structure, Japan** (Katow), 9.7–153; **Record snowfalls and drought, New Eng. and Pacific Southwest** (Ludlum), 9.7–237; **Climatic data, Belgian Congo** (Bultot), 9.7–250.

9.7–222 551.577:551.577.38

*White, R. L. C., **Drought and effective rainfall frequency in the pastoral New South Wales, st of the wheat belt.** *Australia. Bureau of Meteorology, Meteorological Study,* No. 5,

May 1955. 13 p. 4 figs., 9 tables, 2 maps, 8 refs. **DWB**—Formulas used previously t determine the effective rainfall requirements of mesophytic species were found inadequat when dealing with xerophilous species. The effective rainfall requirements of the two type are compared. It is shown that zerophytes have minimum critical needs which are define as the "Initial Effective Rainfalls." After these minimum critical needs have been met xerophilous species require a further amount defined as the "Effective Carry-Over" rainfall A method of calculating the length of "carry-over" before drought sets in is developed Drought persistence, drought risk and probabilities of occurrence are discussed, and example of data analyses for stations in western New South Wales presented. *Subject Headings:* **1. Drought 2. Effective rainfall frequencies 3. New South Wales, Australia.**—*Author's abstract.*

9.7–223 551.577.2(56

Erinç, Sirri and Tümertekin, Erol, **Variations in the amount of precipitation in Turkey** *Istanbul. Université. Coğrafy Enstitüt, Dergesi, Review of the Geographical Inst. of the Univ of Istanbul* (International Ed.), No. 2, **1955.** 176 p. 3 figs. Abstracted from reprint **DWB**—In this study of the limits of variation in the amount of rainfall in different parts o Turkey, certain graphs show the mean maximum and minimum monthly rainfall for the perio 1929–1948 for localities representative of the various regions of Turkey. Variability of rainfall was found to be highest in autumn for most of the stations. The range of positive and negativ deviations from the normal varies with season and region. The longer duration of summe drought in the Mediterranean region is a high probability while the probability of unusually dry springs is relatively slight in Central Anatolia, in comparison with other regions. *Subject Headings:* **1. Precipitation variations 2. Turkey.**—*I.L.D.*

9.7–224 551.577.2:551.506.1(569.4

*Israel Meteorological Service, **Annual rainfall summary 1954/55.** Its *Series B*, No. 8/R pub. **1955.** 13 p. 4 figs., mainly tables. **DWB, DLC**—This useful summary, in Hebrew and English, gives monthly values (days and mm) and annual normals for numerous station in Israel, maps of annual rainfall (mm and % of normal) and histograms of monthly totals *Subject Headings:* **1. Annual precipitation bulletins 2. Israel.**—*C.E.P.B.*

9.7–225 551.577.3(712

Kendall, G. R. and Thomas, M. K. (*Met. Service of Canada, Climatological Sec.*), **Variability and trends of precipitation in the Prairie Provinces.** *Canadian Society of Agronomy, 2na Annual Meeting, Univ. of Toronto, June* 25–28, 1956, *Proceedings, Sec. C.*, p. 17–30. 7 figs. table, 5 refs. **DA?**—A nice study of the seasonal, spatial and frequency distribution, the coefficient of variation, trends, moving means, and cumulative percentual deviations of precip itation in Alberta, Saskatchewan and Manitoba, taken separately and compared. Precip averages from 12 to 22 in. a year in this region, with a marked summer maximum coefficient of variation and of annual precipitation range from 20 to 28% as one goes from moist to dry areas. The 1891–1955 records show a downward trend from 1905–1950 and a recovery from 1950–55. *Subject Headings:* **1. Precipitation data, Prairie Provinces 2. Precipitation variability 3. Precipitation trends 4. Alberta 5. Saskatchewan 6. Manitoba.**—*M.R.*

9.7–226 551.577.32:551.509.54:551.509.33

Neyama, Y., **On the forecasting of heavy rainfall in Western Japan in Bai-u season by means of the analysis of upper troposphere at Marcus Isle.** *Journal of Meteorological Research* Tokyo, 8(12):759–764, Jan. **1957.** 7 figs., 2 tables, 10 refs. In Japanese; English summary p. 759. **DWB, DLC**—In this report, the author described a method of forecasting of heavy rainfall in western Japan in Bai-u season, 31 days in advance. The variation of the height of isobaric surface in the upper troposphere at Marcus Isle, which precedes heavy rainfall in western Japan by 31 days, falls into two different types, viz., type-HR and type-R (*see* Fig. 1) And the statistical result is very helpful in the forecasting. *Subject Headings:* **1. Heavy rainfall forecasting 2. Bai-u 3. Upper troposphere 4. Marcus Isle 5. Japan.**—*Author's abstract.*

9.7–227 551.577.35:551.509.314

†Bultot, F., **Existe-t-il un cycle pluviométrique de 11 ans au Congo belge?** [Is there an ear precipitation cycle in Belgian Congo?] *Belgium. Académie Royale des Sciences niales, [Bulletin des Séances?], new ser.*, 2(2):470–479, **1957.** graph, table, 16 refs. —Statistical study of the long precipitation records of Eala and Elisabethville, Belgian go, showing that there is no 11-yr precipitation cycle in the Belgian Congo. *Subject dings:* **1. Precipitation variations 2. Precipitation periodicities 3. Belgian Congo.**—*A.V.*

9.7–228 551.577.36

Bakthavathsalu, C. M. and Balasubramanian, C. (*both, Agricultural College, Coimbatore*), **ucial limits of monthly rainfall for Taliparamba.** *Indian Journal of Meteorology and Geo- sics*, Delhi, 8(4):407–410, Oct. **1957.** 4 figs., 2 tables, 2 refs. **DWB, DLC**—A study of the ears (1911–1954) of rainfall data of the Agricultural Research Station, Taliparamba for the nsoon months June to Oct. has been made in this paper. The fiducial limits of expected nthly rainfall are given and the pattern of rainfall discussed. *Subject Headings:* **1. Rainfall a analysis 2. Rainfall probability 3. Taliparamba, India.**—*Authors' abstract.*

9.7–229 551.577.37(61)

*U. S. Weather Bureau, **Rainfall intensities for local drainage design in coastal regions of th Africa, Longitude 11°W to 14°E for durations of 5 to 240 minutes and 2-, 5-, and 10-year urn periods.** Prepared by the Cooperative Studies Section, Hydrologic Services Division. sh., D. C., Sept. **1954.** 13 p. 7 figs., 20 refs. **DWB**—This report contains a brief descrip- of the climate of the coastal regions of North Africa with special reference to the nature he rainfall, of the data sources and of methods for estimating 2-year, one-hour rainfall, of the intensity-duration and of the intensity frequency relations. An example of com- ing intensities is presented. Diagrams for estimation of 2-year 1-hour rainfall; of the relations ween 2-year, 10-minute to 2-year 60-minute rainfall; of the rainfall intensity duration curves Central North Africa, and of the relation of 5-year to 2-year 24-hour rainfall for long record ions in North Africa are presented. *Subject Headings:* **1. Rainfall intensities 2. North ica.**—*I.L.D.*

9.7–230 551.577.37:551.501.6:518.3

Weiss, Leonard L. (*Hydrologic Services Div., U. S. W. B., Wash., D. C.*), **A nomogram ed on the theory of extreme values for determining values for various return periods.** *nthly Weather Review*, Wash., D. C., 83(3):69–71, March **1955.** fig., 2 tables, 4 refs., qs. **DWB**—The full page size nomogram may be useful to hydrometeorologists for de- mining the probable frequency of extreme values of rainfall or other climatic elements. s based on the FISHER-TIPPETT type I or the GUMBEL distribution which follows the equation $e^{-e^{-y}}$ where p is probability that an extreme value will be $<X$ and $1-X$ is the probability t an extreme value will equal or exceed X and return period T is the reciprocal of $1-p$, $\ln \ln(1/p)$. The graph can be read to about 1% accuracy. *Subject Headings:* **1. Extreme ues theory 2. Precipitation extremes 3. Nomograms.**—*M.R.*

9.7–231 551.577.37(94)

*Wiesner, C. J. (*Australian Weather Bureau, Sydney*), **Maximum possible precipitation over Tweed River Valley.** *Australian Meteorological Magazine*, Melbourne, No. 4:49–55, Aug. **3.** graph, tables, 4 refs. **DWB**—Methods of U. S. Weather Bureau Hydrometeorological . are used in this depth-duration-area study (based on thunderstorm model) to study 2 strous storm-floods—one for Feb. 1931 and one for June 1945. The former had greater fall (13″ in 24 hrs and 23″ in three days, compared with 12″ and 17″) but the latter did e damage because of greater coefficient of runoff (more rain prior to storm, and lower poration in June than Feb.). Computed values based on dew points are somewhat higher both storms. All are shown on chart compared with thunderstorm model and fit well, extend that curve considerably. *Subject Headings:* **1. Maximum possible precipitation Rainfall depth-duration studies 3. Record rainfall 4. Flood producing storms 5. Tweed ley, New South Wales, Australia.**—*M.R.*

RAIN, SNOW AND HAIL

See also: **Drop impingement** (Dorsch et al.), 9.7–74; **Ice prevention and cornice formation** (Takahashi), 9.7–145; **Hail-tornado formation and relationships** (Hitschfeld, Marshall), 9.7–180; **Elec. charges on snowflakes** (Magono), 9.7–273; **Elec. charges on raindrops, Kiryu and Yokohama, Japan** (Magono), 9.7–274; **Electricity of precipitation** (Magono et al.), 9.7–275.

9.7–232 551.578.

Blanchard, Duncan C. (*Woods Hole Oceanographic Inst., Mass.*), **The supercooli freezing and melting of giant waterdrops at terminal velocity in air.** (In: Conference on t Physics of Cloud and Precipitation Particles, Sept. 1955, **Proceedings.** N. Y., Pergam Press, **1957.** p. 233–249. 9 figs., 25 refs. **DLC** (QC921.5.U5), **DWB**—Giant water dr have been freely suspended in a vertical wind tunnel at temperatures below 0°C. The mann of freezing of these supercooled waterdrops is a function of the wet bulb temperature. temperatures above T_w-4 or -5°C, a shell of ice, first forming on the bottom of the dr will envelope the drop and then freeze inward. This is thought to be analogous to the form tion of sleet since many of the phenomena associated with sleet have been observed in t study. At wet bulb temperatures below -4 or -5°C the freezing appears to occur nea simultaneously over the entire surface of the drop causing the drop to turn to an opaque whi An explanation for the clear and the opaque freezing is partially attributed to the scatteri of light by minute air bubbles that form as air comes out of solution as the water freezes. temperatures above T_w-5°C drops will often remain supercooled for ten minutes or lon while at about T_w-8°C supercooling does not generally extend beyond a minute. T initiation of freezing in drops in this temperature range is explained by freezing nuclei th might be expected to be active at these temperatures. The melting of a frozen drop of l than about 10 mm diameter will proceed with no shedding of liquid water. However, if t frozen drop exceeds this diameter, water will be shed from a liquid ring that forms around t horizontal midsection of the ice pellet. Melting is such that a spherical ice pellet will tra form into a disc. *Subject Heading:* **1. Raindrop phase transitions.**—*Author's abstract.*

9.7–233 551.578.11:551.57

Okita, T. (*Geophysical Inst. Hokkaido Gakugei Univ.*), **Size distribution of giant nc hygroscopic particles in raindrops.** *Meteorological Society of Japan, Tokyo, Journal,* Ser. 35(2):88–93, April **1957.** 5 figs., table, 4 refs. **DWB, DLC**—Individual raindrops w sampled at four stations in mountain area of Hokkaido in the summer of 1954 and 1955 a the size distribution of giant non-hygroscopic particles in the raindrops was studied. T results of observations are as follows: (1) The form of size distribution curve is independent raindrop size and is expressed by a formula $dN/dr=\text{const}\cdot r^{-\beta}$, where r is the radius of t particles. The values of β are between 1.7 and 3.2. (2) Particle content of raindrops approximately the same at various stations and is invariable with time. (3) Particle conte is roughly proportional to the cross-sectional area of raindrops except for the small raindr of diameters less than 0.3 mm. *Subject Headings:* **1. Raindrop size distribution 2. Gia non-hygroscopic nuclei 3. Hokkaido, Japan.**—*Author's abstract.*

9.7–234 551.578.11:551.501.

Wexler, Raymond, **Particle size distribution in rain and snow inferred from Z-R relatio** Blue Hill Meteorological Observatory, Contract AF 19(604)-950, Meteorological Rad Studies, No. 7, Dec. 2, **1957.** 8 p. 12 refs., 13 eqs. **DWB**—It is shown how the parti size distribution for rain or snow may be derived from the Z-R relation and the fall veloci relation. For different empirical Z-R relations, the distributions are computed and compar with observed distributions. A brief discussion is made of the average Z-R relations to expected during the transition from snow crystals to snowflakes to rain. *Subject Headin* **1. Raindrop size distribution 2. Radar precipitation studies.**—*Author's abstract.*

9.7–235 551.578.

Takahashi, Toshio and Kudo, Kiyoshi, **Hardness test of snow.** *U. S. Snow, Ice a Permafrost Research Establishment, Translation,* No. 40, June **1955.** 7 p. tables. **DL**

nslation by Charles A. Meyer & Co., Inc., of their **Sekisetsu no kodo shiken,** from *Seppyo rw and Ice*), Tokyo, 3:264–270, **1941.**—Series of tests show that the volume of the depression ne snow caused by the impact of a falling weight is proportional to the total energy of the act. Exceptions are found if the upper snow layer is too soft or too thin. Tables with al data obtained by penetration of cores are presented. *Subject Headings:* **1. Snow hard- 2. Snow properties.**—*A.A.*

9.7–236 551.578.42(42):551.588

Manley, Gordon (*Bedford College, Univ. of London*), **On the frequency of snowfall in ropolitan England.** *Royal Meteorological Society, Quarterly Journal*, 84(359):70–72, Jan. 3. table, 2 refs. Discussion by L. C. W. Bonacina and reply by Manley in *Ibid.*, 84(361): 284, July **1958. DWB, DLC**—Using S. E. Ashmore's (1952) classification of climato- al stations as A, A-, B, C & D according to the quality of observing and the evolved ations for annual total of days with snow or sleet falling, the author extends the analysis he London and vicinity region for 1926–1955, and shows that at airfields keeping constant ch, more snow days are recorded than at Class B & C (D stations are not considered). ble gives the 30 yr averages of snow days and the averages reduced to 30 ft above sea level 20 stations in greater London, 12 in a larger area and 8 upland stations. Altitude factor unts to 1½ days per 100 ft at Class A, and 1 day per 100 ft at Class B & C stations. Arti- l warmth of London does not have much effect. *Subject Headings:* **1. Snowfall frequency r cities 2. Altitude effect on snowfall frequency 3. Urban influences 4. London, Eng.** *M.R.*

9.7–237 551.578.45(74) 551.577.38(78)

Ludlum, David M. (*Ed., Weatherwise*), **Snowy Northeast—drought Southwest.** *Weather-*, Boston, 9(3):102–104, June **1956.** 4 charts. **DWB**—Several record-breaking snow- ms occurred in the Northeastern States in March 1956—in Portland, Maine, the snowiest e 1871 when records began, at Blue Hill the most since 1885, and at Hartford, Conn., e 1904. At Sacramento, March 1956, it was the driest on record (since 1850) with only ″ recorded, and at San Diego only 2.86″ fell from July 1, 1955 to March 31, 1956, lowest ecord. From Oct.–April much of the area from California east to the Plains had 50% or and many places <25% of normal. *Subject Headings:* **1. Record snowfalls 2. Record ught 3. New England 4. Pacific Southwest.**—*M.R.*

9.7–238 551.578.7:633.51

Lane, H. C., **Simulated hail damage to cotton, 1955–1956.** *Texas. Agricultural Ex- ment Station, College Station, Progress Report*, No. 1953, April 24, **1957.** 6 p. 9 tables. **B** (630.61 T355p)—Hand and machine simulated hail injuries to cotton have been con- ed to develop information about the reaction of the cotton plant to these injuries and their ct on yield. Seasonal conditions were found to affect the extent of regrowth from injuries. re regrowth is made when seasonal temperatures are mild than when high. *Subject Head-*: **1. Hail damage experiments 2. Hail damage to cotton 3. Cotton crop yield.**—*From hor's abstract.*

9.7–239 551.578.72:551.509.317

§Newman, B. W. and Ruckert, P. J. H. (*both, Div. Office, Brisbane*), **Severe hailstorm, sbane, Queensland.** *Australian Meteorological Magazine*, Melbourne, No. 13:31–39, e **1956.** 7 figs., table. **DWB**—A violent thunder and hailstorm occurred from 1655 to 5 on Sept. 27, 1955 at Brisbane. No rain fell with the hail for a considerable period. hailstones were of unusual size and shape (some were like fried eggs). Synoptic conditions, er winds, aerological soundings, weather situation, and the sequence of events connected the hailstorm are described, tabulated and illustrated. Strong W to SW winds were erved above a fairly warm and humid low level flow, and accompanied by a very steep e rate of temperature and a very great depth of subfreezing temperature (10,000 to 33,000 in cloud. A cold front and upper trough passage may have assisted in the hail forming ess. *Subject Headings:* **1. Hailstorms, Brisbane (Sept. 27, 1955) 2. Synoptic-aerological y of hailstorm 3. Brisbane, Queensland.**—*M.R.*

HYDROMETEOROLOGY

See also: **Water balance of earth** (van Hylckama), 9.7–18; **Rainfall, Georgia** (Thomson et al.), 9.7–24; **Disaster and flood warnings, Calif.** (Blum, Klass), 9.7–27; **Isohyetal charts, Calif.**, 9.7–28; **Soil moisture determinations** (Van Bavel), 9.7–86; **River gages** (Khobta), 9.7–119; **Soil moisture instruments** (Knight, Wright), 9.7–120.

9.7–240 551.579(522

Kusakabe, M., **Water balance at Fukuoka.** *Journal of Meteorological Research*, Tok 9(7):455–462, July **1957.** 3 figs., 9 tables. In Japanese; English summary p. 455. **DW DLC**—From the viewpoint of hydrometeorology, it is essential to study the water balan namely, we must investigate not only the amount of precipitation but also the rate of eva transpiration and soil moisture storage. C. W. THORNTHWAITE suggested the conception potential evapotranspiration. Adopting this conception, we can estimate the rate of eva transpiration and explain the water balance. Table 1 shows the water balance at Fukuo (top: average of 66 yrs, 1890–1955, middle: 1939, drought year, bottom: 1941, rainy yea The mean and fluctuation of the monthly rate of potential evapotranspiration, amount precipitation, change of soil moisture storage, soil moisture storage, actual evaporation, wa surplus and water deficiency (1890–1955) are shown in Tables 2–8. Fig. 2 and 3 show frequency distribution of the rate of potential evapotranspiration and the amount of prec itation. The relation between the amount of precipitation and water surplus are shown Table 9 and Fig. 3. *Subject Headings:* **1. Water balance 2. Evapotranspiration 3. Fukuo Japan.**—*Author's abstract.*

9.7–241 551.5

Lange, Otto, **Untersuchungen über die Abflussverhältnisse im Ruhrgebiet.** [Investig tion of runoff conditions in the Ruhr area.] *Deutsche Gewässerkundliche Mitteilungen*, Coble 1(4/5):65–72, Oct. **1957.** table, charts (fold. laid in). **DWB**—Regional averages of pr cipitation (based on 132 stations), runoff, and precipitation-runoff difference are present for the Ruhr basin and its subdivisions. Geological conditions, seasonal variations, a losses due to disappearing underground are considered. The Ruhr River carried the worl heaviest load of water utilization. *Subject Headings:* **1. Runoff 2. Ruhr River area.**—*G.T*

9.7–242 551.579.4(4

Kern, Helmut, **Die Niederschlagsverhältnisse beim Mainhochwasser im Juli 1954.** [T precipitation conditions during the July 1954 flood on the Main.] *Deutsche Gewässerkundlic Mitteilungen*, 1(1):2–5, April **1957.** 3 figs., 13 refs. **DWB**—This unusual storm produc catastrophic floods in the Danube and Elbe on July 7–11, 1954. Details are shown in a tab and on isohyetal charts for the Main Basin. Flood hydrographs for Viereth, Schweinfu Pettstadt and Hallstadt are also shown for the period July 7–12. Greatest total for 5 da was 198 mm (8″) at Berneck—about twice the normal July rainfall. *Subject Heading* **1. Floods Germany (July 1954) 2. Flood hydrographs 3. Main River Basin, Germa** —*M.R.*

9.7–243 551.579

Lesnykh, I. S., **Uproshchennyĭ metod ustanovki svaĭnogo vodomernogo posta.** [simplified method of erecting a water level measuring pile.] *Meteorologiia i Gidrologii* Leningrad, No. 6:54–55, Nov./Dec. **1955.** 2 figs. **DWB, DLC**—A detailed procedure a companied by a diagram is given for erecting a water measuring pile on rivers with ste banks and stone bottoms. The preparation of the trench and the installation of the foundati beam are described. *Subject Heading:* **1. Water level measurement.**—*I.L.D.*

9.7–244 551.579

*U. S. Corps of Engineers, **Columbia River and tributaries below John Day River: Repo of flood of May–June 1956, prepared by Portland District Corps of Engineers.** July 1, 195 44 p. 6 plates, 7 charts, 10 tables (all fold.). **DWB** (M79.4 U582co)—Without upstrea

od regulation, the spring flood of 1956 on the Lower Columbia would have been the 4th gest of record as shown by comparative data each year since 1876 (29.2 ft crest at Van- ver or 1 ft below the 1948 flood disaster). Advanced warnings on March 1 were made on is of snow surveys showing high water content (140–170% of normal) and saturated soil. scharge at The Dalles was reduced from the estimated 940, 000 sec ft to 823,000 sec ft and st from 29.2 to 26.8 ft. Only 1 levee out of 50 failed and damage was $10 million instead an estimated $48 million or a 78% reduction. The report gives a full account of the Me- rology (p. 11–16), Hydrology (p. 17–24), Losses (p. 31–40), etc. with numerous supplemen- y meteorological (temp., rainfall, snow, per cent normal snow water) and hydrological rts, tables, and maps for salient points in the hydrological network of the Columbia Basin. *bject Headings:* **1. Flood, Columbia River (Spring 1956) 2. Flood forecast economics Lower Columbia River.**—*M.R.*

9.7–245 551.579.5

†Jones, P. H. and Skibitzke, H. E. (*Geolog. Survey, U. S. Dept. of Interior, Wash., D. C.*), **bsurface geophysical methods in ground-water hydrology.** *Advances in Geophysics*, ed. by E. Landsberg, 3:241–300, **1957.** 20 figs., table, 64 refs. **DWB, DLC**—Review article ering geophysical, electrical, ionization-radiation, temperature, borehole diameter, flow- ter and fluid conductivity logging or prospecting of mineral content, salinity distribution, lioactivity, thermal conductivity, softness and rate of flow of water in various types of rock soil. Diagrams, nomograms, cross-sections, maps and tables provide useful illustrative terial, and an excellent bibliography is appended. *Subject Headings:* **1. Geophysical ground ter logging 2. Ground water hydrology.**—*M.R.*

9.7–246 551.579.5:551.573

Thornthwaite, C. W. and Mather, J. R., **Computation of soil moisture.** *Johns Hopkins iv. Laboratory of Climatology, Publications in Climatology*, 7(3):397–402, **1954.** 5 figs., efs. **DWB** –Instead of assuming that evapotranspiration does not depend on the remaining ter content in the soil until the wilting point is reached, as was done by the authors previ- sly, the concept of diminishing evapotranspiration with decreasing soil moisture is used. e result is an exponential soil moisture depletion. A comparison with actual observations ows very satisfactory results. *Subject Headings:* **1. Soil moisture depletion 2. Soil traffic- ility 3. Evapotranspiration 4. Coshocton, Ohio 5. College Park, Md.**—*A.A.*

9.7–247 551.579:551.573

†*Erbe, Jost (*Amt für Bodenforschung, Hannover*), **Untersuchungen zur Bestimmung des asservorratsänderungs-Gliedes in der Wasserbilanzgleichung durch Messungen des undfeuchte- und Grundwasserganges.** [Investigations on the determination of the water orage change factor in the water balance equation on the basis of measurements on soil oisture and ground water conditions.] *Deutsches Gewässerkundliches Jahrbuch, Besondere itteilungen*, No. 21, **1957.** 97 p. 15 figs. (some fold.), 15 tables, 98 refs. **DWB**—An borate analytical study of precipitation, evaporation, soil moisture and ground water tribution during 1949–52 at agrometeorological and experimental field stations in Göttingen, eidelberg, Stuttgart, Geisenheim, etc., to determine the elements of the hydrologic balance hydrologic engineers. Soil moisture measurement to 460 cm are presented in extremely tailed tables and graphs. *Subject Headings:* **1. Water balance studies 2. Soil moisture ta.**—*M.R.*

9.7–248 551.579:551.573(781)

*Kansas. Water Resources Fact-finding and Research Committee, **Water in Kansas, 55: a report to the Kansas State Legislature.** Kansas State Finance Council, July 26, 54. 216 p. numerous figs. (incl. photos), tables. **DWB** (M79/781 K16)—The first 50 ges of this comprehensive report on water supply and problems of Kansas are devoted to alyzing of drought and flood data, precip. and its relation to crop yields, evapotranspiration d its variation in various parts of Kansas. The main water problems of Kansas are: 1) excess ter producing floods during 25% of the yrs, and 2) deficiency of water, or drought, during

22% of the past 67 yrs (10 of the 15 drought yrs occurred in pairs, and all 15 occurred alternating decades starting with 1892, 1910, 1931 and 1952). The floods occurred in th periods 1902–09, 1921–30 and 1941–51. Crop yield correlates well with precip. except durin the most extreme wet or dry years, especially if 2-yr averages of precip. are used. *Subje Headings:* **1. Precipitation 2. Drought 3. Floods 4. Evapotranspiration data 5. Wate supply surveys 6. Kansas.**—*M.R.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATE OF PARTICULAR PLACES

See also: **Climate, Mid-western U. S.** (Garland, ed.), 9.7–10; **Climatic atlases, Southeast Asia,** 9.7–31; **Antarctic expeditions** (Markov), 9.7–41; **Geographical conferences, South America,** 9.7–50; **Peach growing climates, Ontario** (Mercier, Chapman), 9.7–78; **Frost damage to winter crops, Belgium** (Vandenplas), 9.7–82; **Frost penetration in soil, Belgium** (Vandenplas), 9.7–203.

9.7–249 551.582(54)(08) 551.585(54) 551.58

*†Chatterjee, Sujan Bandhaba, **Indian climatology: climostatics, climatic classification India with special reference to the monsoons.** Calcutta, (introd. Dec. **1953**). 417 p. (son sections carry paging of original article). 27 figs., 37 maps, 26 tables, numerous refs., biblio at end of each section (about 300 refs.), eqs. "Collection of reprints of original articles fro Geographical Review of India, and other journals, intended as Thesis (Ph.D.) Calcutta Univ.) "This volume constitutes **Pt. 1 of Indian Climatology. Pt. 2,** to be published shortly, w treat **Climodynamics."** Ch. 2, **General methods in climatology: Indian climostatics,** fro *Calcutta Geographical Review*, 12(2):1–26, **1950** (*see* 4.2–252, Feb. **1953,** *MAB*). Ch. **Precipitation characteristics.** *Ibid.*, 13(3):1–199(?), Sept. **1951.** Ch. 4, **Fundamentals classification.** *Ibid.*, p. 200–258. Ch. 5, **Climostatical regions.** *Ibid.*, 15(1):36–55, Mar **1953** (*see* 6.11–339, Nov. 1955, *MAB*). Ch. 6, **Indian monsoons.** [*Ibid.*?], p. 219–41 Appendix A, **Rev. list of annual normal precipitation . . .** Appendix B, **Rev. list of selecte meteorological stations . . . India. DWB** (M82154 C495i). Review in *The Scottish Ge graphical Magazine*, 73(1):54–55, April **1957.**—This collection of articles, printed during 195 1953 in the *Geographical Review* of India, comprises the best (to date) climatology of Indi Every feature of circulation, precipitation, winds, thunderstorms, monsoons, tropical cyclone air masses, humidity, fog clouds; aridity and continentality; upper air temperatures an winds, lapse rates and freezing level; statistical and graphical methods in compilation an analysis of data; and applications to agriculture, hydrology, aviation industry, etc. are treate in detail. Great emphasis is placed on physical processes and on methodology. Moder concepts of statistics and dynamic or synoptic climatology are applied to the older techniqu of classification (climagrams, comfort indexes, hydrologic cycle, histograms, hydrologic cycl hysteresis diagrams, etc.). Seasonal and regional descriptions and analysis also constitute a appreciable portion of the work. The bulk of the basic statistics are saved for Pt. II. Eac chapter contains a good bibliography and a subject index is provided. A list of 733 meteor logical stations and their coordinates, class of station, etc. is included. *Subject Heading* **1. Climate of India 2. Synoptic climatology 3. Precipitation data for India 4. India 5. Pa kistan.**—*M.R.*

9.7–250 551.582.2(675):551.577.3

*Bultot, F., **Présentation du Bulletin Climatologique Annuel du Congo Belge et du Ruanda Urundi (1955).** [Presentation of the Annual Climatological Bulletin of Belgian Congo an Ruanda-Urundi]. *Belgium. Académie Royale des Sciences Coloniales, Bulletin des Séance* 2(6):1231–1248, **1956.** 14 tables. Also: **1956.** *Ibid.*, 3(6):1214–1230, **1957.** 14 table **DLC**—These notes include comments on the areas with monthly anomalies during 1955 an 1956, and tables wherein are presented the monthly and annual extreme values of the different elements of the climate. *Subject Headings:* **1. Climatic data 2. Rainfall anomalies 3. Belgia Congo.**—*A.V.*

9.7–251 551.582.2(493)
Sneyers, R., **Le temps en 1956.** [The weather in 1956.] *Belgium. Institut Royal Météorologique, Publications*, Ser. B, No. 22, **1957.** 46 p. 15 figs., 7 tables, 3 refs. **DLC**—Climatological survey of the weather in Belgium during 1956 (Dec. 1955–Nov. 1956), with comments on every month of the year. Let us note especially: exceptional coldness during winter; persistent maritime currents during summer; an important annual thermic deficiency, and normal precipitations. *Subject Headings:* **1. Annual weather summaries 2. Climatic summaries 3. Belgium.**—*A.V.*

CLIMATIC CHANGES

See also: **Climatology textbooks** (Alisov et al.), 9.7–13; **Rainfall and temperature effects on coffee, Colombia** (Suarez de Castro, Rodriguez G.), 9.7–80; **Agricultural meteorology** (Miller), 9.7–84.

9.7–252 551.583 551.509.6
Our mad weather: what the scientists are doing about it. *Newsweek*, N. Y., 58(11):61–66, Sept. 10, **1956.** 2 figs., 2 photos. **DLC**—Popular summary of recent activities, progress and opinions on climatic changes, weather controls, hurricane warning and modification tornado warning and reconnaissance and drought. Causes of climatic changes were laid to volcanic dust, sunspots, etc. but new information gathered during IGY may provide a better answer. One chart shows course of 1954–55 hurricanes from West Indies to St. Lawrence and another shows 50-year temperature changes in 8 sections of U. S. for summer and winter. Warming mostly in E. and S. and in winter; cooling has occurred in summer of past 3 decades in West and Northwest. *Subject Headings:* **1. Climatic changes 2. Weather control.**—*M.R.*

9.7–253 551.583.2:551.461.2(09)
*Kazancheev, E. N., **Novye dannye ov urovne Kaspiĭskogo moria v kontse [VIII i v nale XIX v.** [New data on the water level of the Caspian Sea at the end of the 18th and beginning of the 19th centuries.] *Vsesoiuznoe Geograficheskoe Obshchestvo, Leningrad, stiia*, 88(6):549–551, Nov./Dec. **1956.** fig., 4 refs. **DLC**—The new data on the level the Caspian Sea at the end of the 18th and beginning of the 19th centuries are derived from manuscript, [**Historical description of the Black Sea economy and the fish catch in the casus Oblast and Kizar District along the shores of the Caspian Sea**] compiled by FEDOR O'KIN in 1825. This manuscript is in the library of the Caspian branch of the all-Union ntific Institute of the Fishery Industry. Detailed excerpts dealing with the level of the pian are given for the years 1778, 1800, 1804, 1810, 1814, 1819 and 1825. A graph sumizing the data shows a rise in gradient sea level from 1788 to 1810 and precipitous drop ween 1810 and 1825. *Subject Headings:* **1. Historic sea level data 2. Caspian Sea.**—*I.L.D.*

MICROCLIMATOLOGY

See also: **Climatology textbooks** (Alisov et al.), 9.7–13; **Geographical conference, Rio de Janeiro,** 9.7–50; **Frost damage to winter crops, Belgium** (Vandenplas), 9.7–82; **Barn climates and temperatures** (La Rock, Yeck), 9.7–85; **Forest temperature differences, Oregon** (Keen), 9.7–87; **Indoor air movement** (Shakhbazian), 9.7–92; **Clothing climate, Arctic** (Woodcock et al.), 9.7–94.

CLIMATIC CLASSIFICATION

See also: **Dendroclimatology, Denmark** (Holmsgaard), 9.7–89; **Dendrochronology, Norway** (Hoeg), 9.7–91; **Climatic classification, India** (Chatterjee), 9.7–249.

9.7–254 551.585.5:631.58
Kellogg, Charles E. (*Soil Conservation Service, U. S. Dept. of Agric., Wash., D. C.*), **The of science in man's struggle on arid lands.** (In: White, Gilbert F. (*ed.*), **The future of lands.** Wash., D. C. American Association for the Advancement of Science, **1956.**

p. 26–46. 10 refs.) **DLC**—The author reviews some of the principal aspects of arid la resources; namely climate, geomorphology, ground water, soil plant distribution, etc. and th discusses the soil use problems in arid regions which include grazing, dry land cereal farmi and irrigational farming. *Subject Headings:* **1. Arid zone research 2. Arid zone agricultu** —*I.L.D.*

9.7–255 551.585.

Khajuria, H. (*Zoological Survey of India, Indian Museum, Calcutta*), **Mammalian fau of the semi-arid tracts of the Deccan and its bearing on the appearance of aridity in the regi** *Science and Culture*, Calcutta, 21(6):293–295, Dec. **1955.** 3 refs. **DLC**—The semi-a portions of the Deccan are deficient in rainfall due to the barriers of Eastern and Western Gha the Nilgiria and Cardamom Hills. Droughts are long and frequent, rainfall averages 20″–2 at best. Most of the mammals (45 species) listed under the humid element for this region a also found in areas of heavy rainfall, such as the Western Ghats. Semihumid elements a also found in regions of normal, but not in regions of heavy rainfall (12 species). These t grou)s are migratory. The third group (desert element), are represented by only 3 spec and the fourth, the "pre-desert" element, which are restricted to this region, are not w known. *Subject Headings:* **1. Semi-arid climates 2. Deccan, India.**—*M.R.*

BIOCLIMATOLOGY

See also: **Human geog. and climatology** (Migliorini), 9.7–5; **Micrometeorological instruments, Germany** (Schnelle, Breuer), 9.7–79; **Frost damage to winter crops, Belgium** (Vandenplas), 9.7–82; **Weather phenomena and eclampsy** (Breuer), 9.7–93; **Weather effects on sulfur metabolism** (Häfelin, Lotmar), 9.7–95.

9.7–256 551.586:612.1

Piccardi, Giorgio, **Neue Resultate mit dem anorganischen Test zum Studium von U welteinflussen—Ein vereinfachter Test (P-Test).** [New results with an ionorganic test f the study of environmental influences—a simplified test (P-Test).] *Wetter und Leben*, Vienn 7(7):151.152, **1955.** 2 refs. **DWB, DLC.** Also: Piccardi, Giorgio and Danti, Mario, **Wirku einer Metall-Abschirmung, ein biologischer Test.** [Action of a metal shield; a biologi test.] *Ibid.*, 7(7):152–154, **1955.** 2 refs. **DWB, DLC**—Under conditions similar to thc described earlier (*Wetter und Leben*, 6:217, **1954**), BiOCL precipitation was carried out sim taneously in free air and under copper shields. The percent of cases in which sedimentati occurs more rapidly under metal is the numerical reply of the P-test (% T). A relationsh was established between the shielding effects and the specific electrical conductivity of t metal constituting the shield. Using the same P-test (described in the first paper), the autho studied the blood coagulation time in five healthy subjects. In 115 experiments carried out Aug. 1955, the coagulation time was 100% longer in shielded blood specimens than in u shielded ones. The coagulation time is correlated with the P-test and a statistically significa correlation is obtained. *Subject Headings:* **1. P-test 2. Coagulation of blood.**—*I.L.D.*

9.7–257 551.586:551.45:

Wright, Norman C., **Domesticated animals inhabiting desert areas.** (In: Institute Biology, London, **Biology of deserts.** London, **1954.** p. 168–172.) **DWB**—This physi logical climatological paper contains a discussion of the endocrine cycle of reproductive glan in desert animals and solar radiation and color patterns in desert animals. The various typ of external color patterns of desert animals and their possible physiological significance, t internal black pigmentation in the peritoneum and pleura of desert reptiles and the penetrati of solar radiation through the integuments of freshly killed insects and reptiles are discusse *Subject Headings:* **1. Animal-desert ecology 2. Physiological climatology.**—*I.L.D.*

9.7–258 551.586:612.

Reuter, H. (*Zentralanstalt für Meteorologie und Geodynamik, Vienna*), **Störungen d Wärmebilanz der Hautoberfläche als massgeblicher Faktor der menschlichen Bioklimat** [Disturbances in the thermal balance of the skin surface as a decisive factor in human b

atology.] *Wetter und Leben*, Vienna, 7(12):291–297, 1955. 2 figs., 9 refs., 4 eqs. **DLC**—author discusses the thermal balance of the skin and attempts to calculate disturbances of ationary thermal state of the skin surface. Approximate formulas developed by the author used to calculate the maximum possible warming of the skin surface exposed to warming ation for extended periods, curves of equal maximum possible warming of the skin for rent amounts of warming radiation, and curves of equal warming duration for different d velocities and percent of maximum warming are presented. *Subject Headings:* **1. Skin peratures 2. Skin radiation absorption.**—*I.L.D.*

9.7–259 551.586.63:551.509.314

Sneyers, R., **Variations régionales et influences climatiques dans quelques rendements a betterave sucrière en Belgique.** [Regional variations and climatical influences on some r beetroot yields in Belgium.] *Belgium. Institut Royal Météorologique, Contributions*, 37, 1957. 14 p. 11 tables, 9 refs. **DWB**—The statistical study of the sugar beetroot ds, as regards the weight of roots and their richness in beet sugar, for some regions of dle Belgium, reveals the existence of significant differences connected with the nature of . The influence of some climatic factors must likewise be considered and, particularly, the onderant importance of meteorological conditions during the month of March should be n into account. *Subject Headings:* **1. Climatic effects on sugar beet 2. Sugar beets elgium.**—*A.V.*

UPPER AIR CLIMATOLOGY

See: **Aerological cross-sections and mean circulation diagrams** (Vuorela), 9.7–161

ENVIRONMENTAL INFLUENCES

See: **Snowfall frequencies, metropolitan Eng.** (Manley), 9.7–236.

MISCELLANEOUS

COSMIC INFLUENCES

See also: **Dendrology** (Vercelli), 9.7–90.

9.7–260 551.590.21

Abbot, Charles G., **Periods related to 273 months or 22¾ years.** *Smithsonian Miscellaneous Collections*, 134(1), Sept. 13, **1956.** 17 p. 7 figs., 3 tables, 6 eqs. **DLC**—According to the hor, a period of 6.6456 days discovered in temperature, other periods in precipitation, v cover dates, periods up to 745,500 yrs in glacial advances, periods in ionospheric disances and finally in the human pulse rate—all are exact multiples or submultiples of the ter period of 273 months, the basic rhythm in solar activities. Discrepancies are blamed olcanic eruptions, military bombing, excessive use of automobiles and finally, the atomic b. *Subject Headings:* **1. Periodicities 2. Solar-terrestrial relationships.**—*A.A.*

9.7–261 551.590.21:551.510.535

Ward, Frederick W., Jr., **Solar, geomagnetic, and ionospheric phenomena as indices of r activity.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, 54, Nov. **1956.** 76 p. 4 figs., 11 tables, 57 refs. **DWB, DLC**—One facet of the problem stablishing or disproving a solar-weather relationship is investigated, namely, that of sing an index of solar variability. The investigation covers three broad fields: solar sics, geomagnetism, and ionospherics. A number of possible measures of solar variability studied to establish the degree of their interrelationship, and the availability, reliability, usefulness of the data published concerning them. Sunspot numbers (specifically R_Z) eas, and the geomagnetic planetary three-hour-range index K_p (or the magnetic character e. C) are two mostly independent and reliable indices. The first is thought to be an

indicator of irregular solar wave radiation, and the latter presumably a measure of sol corpuscular radiation. A number of other solar parameters, such as faculae areas, flare filaments, etc., and sudden ionospheric disturbances (SID's) show varying degrees of i dependence from R_Z and K_p, but at this time the data for them are less reliable and/or usef The other geomagnetic indices either can be derived from K_p or are quite highly correlat with it or R_Z, and the other solar and ionospheric data are either highly or moderately cor lated with R_Z, unreliable, or not in a readily usable form. *Subject Headings:* **1. Solar-magne relationships 2. Solar influences on ionosphere.**—*Author's abstract.*

9.7–262 551.590.24:550.3

Ota, Masaziro and Hashizume, Shoichiro (*both, Aso Magnetic Obs., Kyoto Univ.*), **Ge magnetic variation due to the solar eclipse of June 20, 1955.** *Journal of Geomagnetism a Geoelectricity*, Tokyo, 8(2):76–80, June **1956.** 4 figs., 2 refs. **DWB**—In order to investiga the geomagnetic variation due to the solar eclipse of June 20th, 1955, the S_q-field at 13^h30^m this day is expressed by a simple curve, and the current-system of the additional field due the eclipse is drawn, using the present data and a quantitative result on the bygone eclipse. *Su ject Headings:* **1. Eclipse effects on geomagnetic variations 2. Solar eclipse, June 1955.** *Authors' abstract.*

9.7–263 551.590.25:551.50

Hines, C. O., **Diurnal variations in the number of shower meteors detected by the forwar scattering of radio waves, Pt. 3, Ellipsoidal theory.** *Canadian Journal of Physics*, Ottaw 36(1):117–126, Jan. 1958. 5 figs., 9 refs., 12 eqs. **DWB, DLC**—A theory of meteor 'obser ability' relating to forward-scatter radio experiments was developed in Pt. I of this seri with the use of a simplifying 'cylindrical approximation.' The application of the theory data obtained during meteor showers provides a promising new method for studying t intrinsic strengths of the showers. The principal limitation of the method is due to t inaccuracies of the cylindrical approximation. In the present paper, these inaccuracies a removed by a full development of the ellipsoidal geometry inherent in the forward-scatt process. The more rigorous results are compared with the approximate results at vario stages throughout the analysis. *Subject Headings:* **1. Radio echoes from meteors 2. Mete shower observation.**—*Author's abstract.*

9.7–264 551.590.25:551.50

Hines, C. O. and Forsyth, P. A., **The forward-scattering of radio waves from overdens meteor trails.** *Canadian Journal of Physics*, Ottawa, 35(9):1033–1041, Sept. **1957.** 22 re 19 eqs. **DWB, DLC**—The forward-scattering of radio waves from overdense meteor tra is treated from an elementary point of view. The results indicate that the same geomet factors enter this problem as enter the problem of forward-scattering from underdense tra and that the transition between underdense and overdense trails occurs at the same value charge density as in the backscatter case. These conclusions are not expected to be genera valid when applied to individual trails, but at least they should provide a valid basis for interpretation and prediction of the effects produced statistically by a large number of tra *Subject Headings:* **1. Radio echoes from meteor trails 2. Meteor trail observations.**—*Auth abstract.*

9.7–265 551.590.25:551.50

†Vogan, E. L. and Campbell, L. L., **Meteor signal rates observed in forward-scat** *Canadian Journal of Physics*, Ottawa, 35(10):1176–1189, Oct. **1957.** 9 figs., 22 refs., **DWB, DLC**—Diurnal and seasonal variations in meteor signal rate observed during a month period over a forward-scatter path situated in eastern Canada are discussed. Measu ments were made at a frequency of 49.98 Mc/s. The data show a large spread from hou hour and day to day with the greatest signal rate being observed during the summer mon The influence of ionospheric absorption on the signal rate observed during the morning ho is considered, and it is concluded that the presence of a small amount of attenuation can mo appreciably the form of the diurnal variation. *Subject Heading:* **1. Radio echoes from mete** —*Authors' abstract.*

VISIBILITY

See: **Searchlights and visibility measurements** (Foitzik), 9.7–134.

OPTICAL PHENOMENA

See also: **Scattering of light** (Kagan, Iudin), 9.7–189.

9.7–266 551.593.6

Lunar rays [in the] Gulf of Aden. *Marine Observer*, 24(164):77, April **1954.** fig. **DLC** une 23, 1953, 12 rays of white light so bright as to illuminate the layer of Ac cloud for 18° n the moon. Four longest rays formed a cross. Longest ray, 20° from vertical, extended h 43°—5° altitude and illuminated sea surface. *Subject Heading:* **1. Lunar rays.**—*C.E.P.B.*

9.7–267 551.593.63

Visser, S. W., **De omgeschreven halo.** [The enveloped halo.] *Hemel en Dampkring*, Hague, 53(7):136–138, July **1955.** fig., 2 tables. **MH-BH**—The solar halo which was erved on May 21, 1952 in various parts of Holland is described as reported by various ervers whose location is shown on a map. The problem of when to describe a halo as ing tangents to the circle of 22° or as being enveloped or circumscribed is discussed. The racteristics of the halo and the time of observation for each locality are listed in a table. author concludes that three types of halo must be distinguished, viz. (a) upper tangential with a low sun, (b) both tangential arcs with solar heights of 12° and (c) the completely osed or enveloped halo. *Subject Headings:* **1. Halo observation 2. Netherlands.**—*I.L.D.*

9.7–268 551.593.653:551.510.53

Khvostikov, I. A., **Serebristye oblaka i stroenie stratosfery.** [Noctilucent clouds and the cture of the stratosphere.] (In: Akademiia Nauk SSSR, **Pamiati Sergeia Ivanovicha ilova.** Moscow, **1952.** p. 349–362. 5 figs., photo, table, 6 refs.) **DLC** (QC16.V3A7).): Morozov, V. M., **K voprosu o proiskhozhdenii serebristykh.** [On the origin of nocti- nt clouds.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 7:865–869, July **1956.** efs. Also: Khvostikov, I. A., **O prirode serebristykh oblakov.** [On the nature of nocti- nt clouds.] *Ibid.*, p. 869–872. (Answer to preceding article.) **DLC**—Authors discuss following subjects: the origin of noctilucent clouds; the possibility of the presence of water or at an altitude of 75–80 km; the zone of noctilucent clouds as a boundary layer; the se of the constancy of the height of noctilucent clouds and their nature; the general theo- tal picture of cloud zones in the stratosphere; the size of particles constituting noctilucent ds; and observations of noctilucent clouds as a possible method for investigating the upper ndary of the stratosphere. *Subject Headings:* **1. Noctilucent clouds 2. Stratospheric ds 3. Stratospheric structure.**—*I.L.D.*

ELECTRICAL PHENOMENA

See also: **Synoptic atmospheric-electric recordings** (Reiter), 9.7–20; **Electrical conductivity of air** (Sagalyn, Faucher), 9.7–113; **Conductivity meters and ion concentration** (Imianitov), 9.7–137; **Atmospheric electricity instruments and measurements** (Imianitov et al.), 9.7–138; **Thunderstorm recorders and electricity** (Loch), 9.7–139; **Ion counters** (Reinet), 9.7–140; **Whistling atmospherics** (Storey), 9.7–279.

9.7–269 551.594.13

Kasemir, H. W., (*Met. Obs., Aachen, Germany*), **Measurement of the air-earth current sity.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 91–95, Nov. **1955.** fig., 13 eqs. **DLC**—There is no doubt today that the simultaneous stration of the atmospheric-electric field F, the air-earth current i, and the conductivity is essary for the evaluation of atmospheric electric measurements. In this field, the registra- of the air-earth current i involves specific difficulties, not only with regard to the smallness his current, but also because the conduction current is superimposed on the large current of uence charges. This troubling influence current can be eliminated completely as may be wn theoretically and experimentally. From the MAXWELL equation the following equation

for the current J (through the measuring resistance) is deduced

$$J = (\theta/T)i + (1/T)(1-\theta/T)e^{-t/T} > \int ie^{t/T}dt,$$

where t is the time, θ, the time constant of the atmospheric electric field at the measur place, and T, the time constant of the input of the apparatus. The air-earth current i can given as a function of time in any form. From this equation follows $J=i$, for $\theta=T$, that the current J flowing through the measuring resistance is identical with the air-earth curre The troubling influence currents, which are given by the second term of the equation, compensated to zero. By a more electrotechnical substitute circuit diagram, the meaning the condition $\theta=T$ is demonstrated. From the slow diurnal variations up to the quick va ations of lightning flashes, the recording of the air-earth current is independent of the frequer and correct in the amplitude. The registration apparatus is simple and the theory is clear that the air-earth current is now accessible for the atmospheric electric technique of measu ment. *Subject Headings:* **1. Air-earth current density 2. Atmospheric electricity measu ments.**—*Author's abstract.*

9.7–270 551.594.2

Chalmers, J. Alan (*Durham Univ., Eng.*), **Point discharge.** *U. S. Air Force. Cambri Research Center, Geophysical Research Papers*, No. 42:222–226, Nov. **1955.** 14 refs. **DLC** The following matters are discussed: the part played by point discharge in the transfer charge between cloud and earth; the relation between point discharge and field streng point discharge at natural and artificial points; space charge due to point discharge; effect point discharge on rain. *Subject Heading:* **1. Point discharges.**—*Author's abstract.*

9.7–271 551.594.2

Michnowski, Stanisław (*Inst. of Geophysics of the Polish Academy of Sciences*), **Po discharges in the interchange of electric charge between the earth and the atmosphere.** *A Geophysica Polonica*, Warsaw, 5(2):123–134, **1957.** 2 tables, 24 refs. English summa p. 123; Polish summary p. 134. **DWB, DLC**—Problems concerning the role of point dischar in the interchange of electric charge between the earth and the atmosphere are discuss Results of measurements made during a number of thunderstorms in the area of the G physical Observatory in Swider are given. *Subject Headings:* **1. Point discharges 2. Thund storm electricity.**—*Author's abstract.*

9.7–272 551.594.222(4

ten Kate, H., **Sint Elmusvuur.** [St. Elmo's fire.] *Hemel en Dampkring*, 50(1):1–3, 19 **DWB, DLC**—Several instances of St. Elmo's fire, observed by the author and by others dur heavy snowfall in Dec. 1950, are described. The electric origin of this phenomenon is stres and a brief history of reports of this phenomenon is presented. *Subject Headings:* **1. St. Elm fire 2. Netherlands.**—*I.L.D.*

9.7–273 551.594.25:551.57

Magono, C. (*Hokkaido Univ.*); Oguchi, H. (*Tokyo Art Univ.*); Arai, B. (*Yokohama N Univ.*) and Okabe, H., **The electrical charge of snow flakes.** *Meteorological Society of Jap Journal*, Ser. 2, 34(1):41–50, March **1956.** 15 figs., 3 plates, 10 refs., eqs. In Japane English summary p. 41. **DWB, DLC.** Also: **Electric charge of snow flakes.** *Seppyo* (*Sn and Ice*), Tokyo, 18(2):56–60, Aug. **1956.** table, 37 refs. In Japanese. **DWB**—In winter season of 1955, the electric charge of snowflakes was individually measured simulta ously with the atmospheric field intensity and the size of snowflakes, using a vacuum t electrometer, WULF's electrometer and filter papers, respectively. The shape of snowfla was also observed by the microphotographic method. The following results were obtain 1) When the field gradient was steep, the sign of charge on snowflakes was generally the posite of that of the prevailing field. Under the weak field, the sign was changeable; 2) T steeper the field gradient and the larger the size of snowflakes, the larger the charge on th was; 3) The charge was extremely large while the field gradient was rapidly changing, in ot words, while the string which showed the gradient was vibrating. The vibrating phenome

ıe string may perhaps represent the existence of a strong turbulence; 4) No special relations observed between the sign of electric charges and the crystal form. Considering those lts, it is supposed that the snowflakes carry electric charges mainly as a result of the tive ion capture under an atmospheric field similar to what happens in the case of rain- s, and on that mechanism are superposed the other effects, that is to say, the friction or ıption of snowflakes. *Subject Heading:* **1. Electrical charges on snowflakes.**—*Authors' act.*

9.7–274 551.594.25:551.578.1

Magono, C. (*Hokkaido Univ. Sapporo*) and Okabe, H. (*Yokohama National Univ.*), **On electric charges of single raindrops and surface field intensity under thunder clouds.** *orological Society of Japan, Tokyo, Journal*, Ser. 2, 34(6):346–352, Dec. **1956.** 12 figs., bles, 16 refs., eq. **DWB, DLC**—Electric charges of single raindrops were simultaneously sured for their sizes and surface field intensity under thunder clouds at Kiryu and Yoko- a. It was found that a definite inverse relation between the signs of charge and field ed in Japan also, except during the short period when the sign of the surface field changed. reason of this exception was considered as follows: during the period when the sign of changed, the field intensity was almost zero; therefore, the charges of falling raindrops red no charge deformation as a result of the capture of ions according to WILSON's theory. sidering the phenomena, one can explain the wide divergencies observed in the relation een charge and field. To examine SMITH's calculation, it is desirable that the charges of y raindrops be observed within a short period in which the field intensity is considered to onstant. *Subject Headings:* **1. Electrical charges on raindrops 2. Thunderstorm field nsities 3. Kiryu, Japan 4. Yokohama, Japan.**—*Author's abstract.*

9.7–275 551.594.25:551.578.1

Magono, Choji; Orikasa, Keitaro and Okabe, Hiroshi, **The charge on precipitation elements surface electric potential gradient.** *Sapporo, Japan. Hokkaido Univ. Faculty of nce, Journal, Ser. 7, Geophysics*, 1(1):7–20, Jan. **1957.** 18 figs., 12 refs., eq. **DWB**—The ric charge on individual precipitation elements was measured simultaneously with the ce potential gradient in Northern Japan, using respectively a vacuum electrometer and ULF type electrometer. The size and shape of the elements were also observed by the paper and microphotographic methods. Time variations of precipitation charge and ntial gradient are presented graphically. The results suggest that the precipitation ents are electrified partially by WILSON's mechanism under fairly intense field, and on that nanism are superimposed certain other effects. If an element is influenced by both positive negative field during its fall, the effect of the fields will be cancelled and the element will y its original charge to the earth's surface without any charge deformation. *Subject dings:* **1. Electricity of precipitation 2. Electrical charges on raindrops.**—*From authors' act.*

AURORAS

See also: **IGY aurora and airglow program** (Currie), 9.7–35; **Aurora and airglow investigations** (Chapman), 9.7–38; **UHF radar observations of aurora, South Dartmouth, Mass.** (Fricker et al.), 9.7–100; **Auroral recorders** (McNamara), 9.7–102.

9.7–276 551.594.5

Aurora borealis. *Split, Yugoslavia. Hidrografski Institut Mornarice. Meteorološki Ots- Vremenske Prilike*, 3(1/2):49, July **1948.** **DWB**—Eye-witness reports on auroras observed three ships (37°N, 126°W; 35°N, 66°W; 39°N, 69°W) on the morning of March 15, 1948. *ect Heading:* **1. Auroral observations.**—*G.T.*

9.7–277 551.594.51:551.521.326

Chamberlain, Joseph W. (*Yerkes Obs., Univ. of Chicago*), **Discharge theory of auroral rays. The airglow and the aurorae: a symposium.** London, Pergamon, **1956.** p. 206–221. bles, 43 refs., 30 eqs.) **DWB** (M94.5 A298)—A provisional discharge theory of auroral is developed from the standpoint of the luminosity resulting from inelastic electron

collisions. Energy-distribution curves and drift velocities for electrons in an electric fi are derived, account being taken of energy losses through inelastic collisions. It is shown th if the electron density, N_e, decreases slowly with height, a ray could be formed in which t green [O I] luminosity is nearly constant over a large range of atmospheric density a altitude. Furthermore, a reasonable assumption for the absolute value of N_e leads to auro brightnesses of the correct order of magnitude. The ratio of intensities of the red/gre oxygen lines are discussed in terms of collisional deactivation, and an illustrative computati is presented. High-excitation emissions, such as N_2+, would not be present in the low part of the ray, but may become strong at higher altitudes. The need for more definiti measurements of height variations in the spectra of pure rays is emphasized. A discussion ionization equilibrium in a ray indicates that the discharge will maintain the necessary electr density. It is suggested that fluctuations in the brightness of a ray may arise from freque dispersing of the ray's ionization by upper-atmospheric winds. The production of an electi field in the atmosphere is discussed. It is suggested that incident protons might provide t necessary acceleration of ionospheric electrons, with the electron current becoming constrict along narrow paths, which appear as rays. *Subject Headings:* **1. Auroral theories 2. Electro excitation of auroras.**—*Author's abstract.*

9.7–278 551.594.51:546

Gartlein, C. W. and Sprague, C. (*both, Physics Dept., Cornell Univ.*), **Hydrogen in auro** *Journal of Geophysical Research*, Wash., D. C., 62(4):521–526, Dec. **1957.** fig., 16 r **DLC**—Auroral spectrograms taken at Ithaca, N. Y., and Arnprior, Ontario, showing hydro lines have been studied. The velocity of incoming protons, as deduced from the Dopp shift, has been used to calculate the penetration of the protons into the atmosphere. penetration appears possible to the 115-km level. The intensity of hydrogen alpha has b obtained (1) by comparison with the known intensity of oxygen radiation 5577 of the norr night sky, (2) calculation from characteristics of the photographic emulsion, and (3) calculation from the total intensity of auroral light. These methods agree within an orde magnitude. The H-alpha flux is about 10^{-4} erg per cm^2 column per steradian per sec. *Sub Heading:* **1. Auroral hydrogen lines.**—*Authors' abstract.*

SFERICS AND RADIO METEOROLOGY

See also: **Radio noise** (Horner, Harwood), 9.7–106; **Sferics measurement and recorders, Canada** (McKerrow), 9.7–107; **Sferics measurements** (Watt, Maxwell), 9.7–110; **Inversion effects on microwave propagation, Sapporo, Japan,** 9.7–198.

9.7–279 551.508.86:551.594

Storey, L. R. O., **A method for interpreting the dispersion curves of whistlers.** *Canad Journal of Physics*, Ottawa, 35(9):1107–1122, Sept. **1957.** 5 figs., table, 10 refs., 30 **DWB, DLC**—This paper considers how the dispersion curves of whistlers may be interpre to provide information on the distribution of electron density with height in the outer atm sphere. The simpler inverse problem, that of computing the dispersion curve for a given tribution, is considered first. On the assumption of longitudinal propagation in a di magnetic field, the dispersion curve is derived in the form of an equation relating the proc $tf^{\frac{1}{2}}$ to the frequency f. The equation can be represented by a power series in f, which is us for estimating departures from the elementary $f-\frac{1}{2}-t$ relationship at frequencies where th departures are small. The coefficient of f^n in this series is termed the "dispersion constan order n." The main problem is now treated, regarding the above equation as an inte equation determining the distribution of electron density along the path. This integral eq tion is solved in series, making use of the same power series in f. The dispersion cons of order n is shown to be proportional to the nth moment of the distribution, suitably expre and weighted. From the values of the moments, it is possible to deduce both the initial magnetic latitude of the path and the distribution of electron density along it. When observed dispersion curve is incomplete, so that only the dispersion constants of lower o can be measured, the method yields an approximation to the distribution. *Subject Headi* **1. Whistling atmospherics 2. Electron density in outer atmosphere.**—*Author's abstract.*

RT II. RECENT LITERATURE ON EXTENDED AND LONG RANGE FORECASTING

Compiled by: *Geza Thuronyi*

INTRODUCTION

he purpose of this compilation is to publish a group of unpublished abstracts on long range sting which accumulated over the last few years because of printing limitations. It should be that the subjects of extended and long range forecasting have been covered in two earlier graphies, those of January and February 1951 (*MAB*, Vol. 2, Nos. 1 and 2). Additional items ted below in chronological order (of printing in *MAB*) and in the detailed subject outline which s. Thus it is hoped that this compilation will serve the additional purpose of providing an to some of the current world literature on extended and long range forecasting.

Pt. III of this issue there are listed the contents of several issues of *Moscow. Tsentral'nyi ut Prognozov, Trudy*, which include pertinent articles (as yet unabstracted). These may be ered as a supplement to this compilation, showing the most recent Soviet literature available.

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Kenya, (6.7–143)
Madagascar, (7.7–119)
Tunisia, (3A–257)
Australia, 9G–18, (9–42, 4D–18, 4D–130, 4D–211, 4D–268, 5.6–81, 8.11–148)
Hawaiian Islands, (6.8–121)

1889

9G–1 551.509.2(0

§*Pomortsev, Mikhail Mikhailovich, **Ocherk ucheniia o predskazanii pogody: sinopticheska meteorologiia.** [Outline for the study of weather forecasting (synoptic meteorology).] St. Pete burg, Tipografia "Artilleriĭskogo Zhurnala," **1889.** 207 p. 21 figs. (fold. at end), tables. **DLC** One of the first known texts on synoptic meteorology, taking up historic development, cosmic a solar relations, telegraphic networks, observations, compilation and publishing of synoptic data a forecasts, special forecasts of: 1) temperature, 2) pressure and wind, 3) humidity, fog, cloud and de 4) precipitation, anticyclones and their character and movement, cyclones and their tracks, ridg troughs, etc.; European weather types from 1885–88 and relation to subsequent weather in Russi forecasts from a) synoptic charts, b) from single station data, and c) long range forecasting fr periodic phenomena. Numerous illustrative synoptic charts, seasonal storm or anticyclone trac from Eurasia and monthly mean pressure charts are included in appendix. The tables of weath types according to direction of flow of air constitute an air mass or synoptic climatology, and t chapter (p. 11–22) on cosmic influences summarizes the current knowledge on solar influences weather, which is used in the chapter on long range forecasting (p. 196–202). *Subject Headin* **1. Synoptic meteorology textbooks 2. Solar influences 3. Synoptic climatology.**—*M.R.*

1934

9G–2 551.5(0

†Okada, Takematsu, **Kisho-gaku.** [Meteorology.] Rev. ed. Tokyo, Iwanami Book C Ltd., **1934–1935.** 2 v. v. 1, pub. **1934.** 484 p. 21 plates. v. 2, pub. **1935.** The first edition w issued by same publisher in **1927**, and had 1042 p. 267 figs., and 10 plates. **DLC** (Oriental Japanese, uncat.)—Very elaborate textbook. Contents, Volume 1: 1. Atmosphere. 2. Air te perature. 3. Soil temperature. 4. Barometric pressure. 5. Humidity. 6. Density of air. 7. Wi 8. General circulation of the atmosphere. 9. Monsoon. 10. Land and sea breezes. 11. Mounta and valley breezes. 12. Evaporation. 13. Saturation and condensation. 14. Cloud. 15. Fog a haze. 16. Sunshine. 17. Rain and snow. 18. Hail. 19. Dew and hoar frost. 20. Freezing ra 21. Precipitation. Appendices, Mathematical supplements and references. Volume 2: 1. Tropi cyclone. 2. Extra-tropical cyclone. 3. Special winds. 4. Thunderstorms. 5. Waterspou 6. Squalls. 7. Anticyclone. 8. Sandstorm. 9. Weather. 10. Weather forecasting. 11. Lo range weather foreshadowing. 12. Atmospheric electricity. 13. Atmospheric optics. 14. So radiation. 15. Atmospheric acoustics. 16. Aerology. Appendices, Mathematical supplements a references. *Subject Heading:* **1. Meteorology textbooks.**—*H. Arakawa.*

1946–1949

9G–3 551.509.33:551.583.

Manohin, Vital, **Pojav singularitet, kot nova osnova vremenskih napovedi.** [Singularities as new basis for weather forecasting.] Ljubljana, Zavod za Meteorologijo in Geodinamiko na Univer **1946.** 18 p. graph, foot-refs. **DLC** (QC995.M27)—In this study singularities in precipitati and cloud cover at Ljubljana are shown for each year from 1933 to 1946 for the period June 21 July 16 in an attempt at forecasting the weather conditions for a week or two in advance. T system really amounts to forecasting by analogues of weather sequences. Each significant insignificant) change in weather is marked by a letter on the curves for better identification a correlation. Whenever a sequence of letters fits another year's sequence approximately, the foreca can be made so that future sequences will agree more or less. Discrepancies in the forecast and act sequences for 1946 are discussed in detail with respect to causes, etc. Two almost identical sequen (1897 and 1946) are shown graphically. *Subject Headings:* **1. Extended forecasting 2. Anal forecasts 3. Ljubljana, Yugoslavia.**—*M.R.*

9G–4 551.509(0

†*Ootani, Tohei and Takahashi, Koichiro, **Tenki-Yoho-Ron.** [Weather forecasting.] Tok Chizin Book Co., Ltd., **1946.** 414 p. 179 figs., numerous tables, 69 refs. In Japanese.—Rep sentative textbook on weather forecasting written by Japanese experts. Twelve chapters inclu synoptic weather forecasting, kinematic analysis, aerological analysis, air mass analysis, quantitat objective forecasting, special forecasting (fog, thunderstorm, dew, icing, waves and swell, storm tid floods, fire weather, etc.) and long range forecasting. *Subject Headings:* **1. Weather forecast textbooks 2. Synoptic analysis.**—*H. Arakawa.*

9G–5 551.509.33:523.74

Bordner, John Serenus, **Sun energy and weather.** Madison, Wisconsin, Weather Forecast Service, **1949.** 20 p. figs. **DWB**—A popular disquisition on sunspots, their effect on temperatu

infall, soil moisture and stream flow on earth (much simplified) and a prediction for a few years ead (in broad general terms). Advice to farmers of the Midwest as to planting corn, oats, wheat nd hay and to foresters, biologists, etc., is included. *Subject Headings:* **1. Sunspot effects on eather 2. Long range forecasting 3. Agricultural meteorology.**—*M.R.*

1951

9G–6 551.509.33(52)

Ando, M., **Researches on long-range forecasting in Tohoku district in this year.** *Journal of Meteorological Research*, 3(9):343–347, July **1951,** In Japanese. **DWB**—Method based on use of pper air circulation patterns and pressure anomalies. *Subject Headings:* **1. Long range forecasting . Tohoku District, Japan.**—*M.R.*

9G–7 551.509.33:551.501.7:551.513(52)

§Fuke, M., **Researches on one week forecast.** *Journal of Meteorological Research*, 3(9):295–300, uly **1951.** 7 figs. In Japanese. **DWB**—Report on statistical verification of synoptic forecasts ased on study of zonal index and Grosswetterlage types for Far East. *Subject Headings:* **1. Ex- nded forecasting 2. Zonal index 3. Grosswetterlagen (Broad weather situations) 4. Far East . Japan.**—*M.R.*

9G–8 551.509.33:551.509.5(52)

Kadoya, K., **Abstract of the data in long-range forecasting.** *Journal of Meteorological Research*, (9):336, July **1951.** 2 tables. In Japanese. **DWB**—Shows example of taking long range forecasts f pressure and temperature deviations and reducing them to quantitative values which can be ubject to verification or statistical study. *Subject Headings:* **1. Long range forecasting 2. Forecast erification 3. Statistical studies 4. Japan.**—*M.R.*

9G–9 551.509.33:551.524.3:519.241.1

Nagao, T., **Character of weather group and its application, Pt. 1.** *Journal of Meteorological Research*, Tokyo, 3(14/15):493–498, Dec. **1951.** 5 figs., table. In Japanese; English summary . (31). Also his: **Weather group and its application, Pt. 2.** *Ibid.*, 4(2):72–75, May **1952.** 7 figs. nglish summary p. (4–5). **DLC, DWB**—Frequency distribution and auto-correlation coefficient f air temperature in August at Fukushima are analyzed with a view to preparing extended tem- erature forecasts from these factors. The error in forecast value of frequency distribution with a idth of 2°C and lengths of period of the auto-correlation coefficient are determined. Observational ata are compared with predicted values and found to justify this approach to extended forecasting. For later reports in this series *see* 7.5–150; 9G–59 and 9G–87.) *Subject Headings:* **1. Extended orecasting 2. Temperature forecasting 3. Frequency distributions 4. Autocorrelations 5. Japan.** —*G.T.*

9G–10 551.509.33:551.509.5(52)

Ogawara, M., **Several statistical problems in long-range forecasting.** *Journal of Meteorological Research*, 3(9):337–341, July **1951.** numerous eqs. In Japanese. **DWB**—A long paper on theo- etical statistics as applied to making and verifying long range forecasts. *Subject Headings:* **1. Long ange forecasting 2. Objective forecasting 3. Japan.**—*M.R.*

9G–11 551.509.33:551.577.31(52)

Oosawa, Koichiro, **Ten-day forecast in Baiu season by Baur's method.** *Journal of Meteorological Research*, 3(9):293–294, July **1951.** table. In Japanese. **DWB**—Brief article based on analogs nd singularities. *Subject Headings:* **1. Extended forecasting 2. Bai-u 3. Baur's method 4. Ja- an.**—*M.R.*

9G–12 551.583.14:551.509.33

Tajima, S., **Two groups of cool summer in view of climate forecasting.** *Society for the Long-Range Forecast Research of Tōhoku District, Journal*, 11(2):11–16, Nov. **1951.** 7 figs., 6 refs. In apanese, English summary p. 249 (reprinted and laid in). **DWB**—The author investigates the roperties of two groups of cool summers, one of which occurred from 1897 to 1913, and the other om 1931 to the present. It is found that summer temperature can be estimated to some extent y the extreme maximum and minimum temperature of the northeastern district of Japan in spring, hich is considered something like the air mass index. However, relations between these indices nd subsequent summer temperature are not simple and almost opposite for the two periods in- estigated. It appears that solar activity is weak in the earlier and intense in the later period. onsequently, the position and energy of anticyclones of the Northern Pacific differ during each

of the two periods. *Subject Headings:* **1. Climatic trends 2. Temperature forecasting 3. Seasonal forecasting 4. Japan.**—*From author's abstract.*

9G–13 551.583.14:551.509.33

*Takahashi, M., **Secular variation of summer temperature in Tōhoku and Hokkaido district (Generalization of so-called Umeda's method, Pt. 1).** *Society for the Long-Range Forecast Research of Tōhoku District, Journal*, 11(2):1–10, Nov. **1951.** 2 figs., 6 tables, 5 refs. In Japanese; English summary p. 249 (reprinted and laid in). **DWB**—Three different sequences of characteristic temperature development are determined as follows: a) low temperature in July of the first year, high temp. in Jan. or Dec. of the second year and high temp. in June to Aug. in the third year; b) low temperature in July of the first year, less precipitation in the second, and low temp. in Apr. or May of the third year and c) large mean value of vapor pressure in the first year, high temp. in April or May of the second, and high temp. in June to Aug. of the third year. Data on the occurrence of these sequences during the last fifty years are presented. *Subject Headings:* **1. Climatic trends 2. Seasonal forecasting 3. Summer temperatures 4. Tohoku District, Japan 5. Hokkaido District, Japan.**—*From author's abstract.*

9G–14 551.509.33:551.513.1(52)

Yoshizawa, S. and Suzuki, S., **Application of isopleth in Europe to ten-day forecast.** *Journal of Meteorological Research*, Tokyo, 3(9):301–302, July **1951.** In Japanese. **DWB**—Report on movement of troughs and blocking in upper atmosphere following NAMIAS. *Subject Headings:* **1. Extended forecasting 2. Blocking action 3. Japan.**—*M.R.*

1952

9G–15 551.509.33

Fuke, M., **A method of long-range forecasting from spring to summer.** *Journal of Meteorological Research*, Tokyo, 4(7):402–404, Oct. **1952.** In Japanese; English summary p. (26). **DWB, DLC**—The method of long range forecasting developed in this paper is based on the assumption that similar features of general circulation from winter to spring are followed by similar general circulation from spring to summer. Anomalies of winter temperature as an index of atmospheric activity are calculated and classified into seven types, each type being characterized by different weather. *Subject Headings:* **1. Seasonal forecasting 2. Temperature anomalies.**—*Author's abstract.*

9G–16 551.509.33

Fukuda, K., **On the climate forecasting of summer.** *Journal of Meteorological Research*, Tokyo, 4(7):405–407, Oct. **1952.** 3 figs., 5 refs. In Japanese; English summary p. (26). **DWB, DLC**—Based on reports submitted by weather stations under the jurisdiction of Tohoku District Weather Center at Sendai this paper contains information on the following points: (1) The relation between the last date with frost and July temperature. (2) The relation between number of days with frost in March-April and temperature in summer. (3) The relation between temperatures in May and in summer. *Subject Headings:* **1. Seasonal forecasting 2. Tohoku District, Japan.**—*From author's abstract.*

9G–17 551.577.32:551.509.33

Hiyama, K., **On the seasonal forecast of "Baiu" or rainy season in Japan, Pt. 1.** *Journal of Meteorological Research*, Tokyo, 4(7):420–423, Oct. **1952.** fig., 2 tables. In Japanese; English summary p. (27). **DWB, DLC**—Some relations between the characteristic pressure variation at St. Paul Island (Pribiloff Is., Bering Sea) in May and the onset of the "Baiu" season in Japan is investigated on Northern Hemisphere surface charts of 19 years. The analysis reveals several corerlations between high and low pressure on St. Paul and onset of "Baiu" in Japan. *Subject Headings:* **1. Bai-u 2. Seasonal forecasting.**—*From author's abstract.*

9G–18 551.509.33

Karelsky, S. (*Res. Sec., Australian Weather Bureau,*) **Problem of extended forecasting in Australia.** *Australian Meteorological Magazine*, Melbourne, no. 2:42–49, Dec. **1952.** 4 refs. **DWB**—Two approaches to forecasting are recognized: 1) the climatological or statistical and 2) the dynamic. Methods of NAMIAS (climato-dynamic) and BAUR (analog as well as climate-dynamic); synoptic-statistical (MULTANOVSKIĬ); and analog method of LAMB and ELLIOT are reviewed. These methods require much modification for use in S. Hemisphere because of differences in circulation patterns and in land-sea distribution. Multanovskiĭ's "Composite chart" method seems to be the most promising, and enables 4 to 7 day forecasts to be made. The "natural period" and "axis" concepts of Multanovskiĭ proved of little value in Australia. Sequence of charts (LAMB

nd others) give a most valuable clue to future weather, by analogy. Application to Australian ea is discussed. *Subject Headings:* **1. Extended forecasting 2. Australia.**—*M.R.*

9G–19 551.509.33:551.311.184

Ninomiya, S., **Application of the ice-drift over the Okhotsk Sea to seasonal forecasting.** *Journal Meteorological Research*, Tokyo, 4(7):424–425, Oct. **1952.** In Japanese; English summary p. (27)–28). **DLC, DWB**—On the basis of reports on ice drift observed from Abashiri over a 20-yr period, ne usefulness of ice drift as a factor in seasonal forecasting is investigated. It is found that (1) pres- ure at Abashiri rises when the amount of ice drift is abundant; (2) when ice drift is abundant and ose to the shore, the temperature on the shore reaches approx. 2°C. (3) There is also a correlation etween summer temperature and the amount of ice drift during the preceding year. *Subject eadings:* **1. Seasonal forecasting 2. Ice drift 3. Japan.**—*From author's abstract.*

9G–20 551.509.33:551.577.38

Ochi, K., **On the long-range forecasting of drought in summer and winter by making use of evelopment and decay of monsoon.** *Journal of Meteorological Research*, Tokyo, 4(7):395–401, ct. **1952.** 9 figs. In Japanese; English summary p. (25)–(26). **DLC, DWB**—Results of sta- stical studies on the relation between development and decay of monsoon and drought in summer nd winter are summed up as follows. (1) In years during which typhoons generate in the north-west rea of the Caroline Islands, small amounts of rainfall occur, while years during which typhoons enerate in the neighborhood of the Marianas (especially in the eastern part) show large rainfall mounts. The birth position of typhoons depends on the development and decay of monsoon. 2) From an analysis of the mean value of maximum temperature in July–Aug. and of minimum mperature in Jan.–Feb. as an index of monsoon (1926–1951) it is found that this index is closely elated to drought in summer and winter. *Subject Headings:* **1. Long range forecasting 2. Drought orecasting.**—*Author's abstract.*

9G–21 551.509.33:551.515.13

Otsuka, R., **A study on the extended forecasting.** *Journal of Meteorological Research*, Tokyo, (7):343–347, Oct. **1952.** 4 figs., 12 refs. In Japanese; English summary p. (23). **DLC, DWB**— he average movement of troughs from west to east is investigated on Northern Hemisphere surface harts and 700 mb upper air charts. It is found that the annual mean speed at 35°N is approximately ° of longitude per day (9.9° in winter, 9.7° in spring, 8.3° in summer and 8.3° in autumn). he author also analyzes the relation between the daily weather in the Kanto District and the trough assing over it. *Subject Headings:* **1. Extended forecasting 2. Movement of troughs 3. Pressure atterns.**—*Author's abstract.*

9G–22 551.509.33:551.524.36

Tetrode, P., **Nabetrachting over twee verwachtingen met betrekking tot het bijzondere jaar 947.** [Review of two forecasts in relation to the exceptional year of 1947.] *Hemel en Dampkring*, 0(6):105–107, **1952.** 8 refs. Also his: **Long-range forecasts of almost unprecedented tem- erature-excesses in the Netherlands.** *I.U.G.G. Association of Meteorology, Brussels, 1951, Procès- erbaux des séances, Mémoires et Discussion*, pub. **1953.** p. 113–119. **DWB**—The author em- loyed frequency relations with previous weather cycles (27 months and 24 years), solar activity nd preceding weather maps successfully forecasting the severe winter 1946/47, the hot summer 947 and mild winter 1947/48. Large deviations from normal were probably connected with a very igh sunspot maximum. Multiple correlations failed for these cases. *Subject Headings:* **1. Seasonal orecasting 2. Solar weather relationships 3. Extreme temperatures 4. Netherlands.**—*A.A.*

1953

9G–23 551.509

Aclarando falsos conceptos sobre previsión del tiempo. [Correcting some erroneous beliefs bout weather forecasting.] *Revista Meteorológica*, Montevideo, 12(44)/45):64–68, June/Dec. **1953. WB**—Excerpts from a booklet on weather forecasting by W. Schwerdtfeger. In the passages uoted, the author comments on popular weather maxims, on lunar influences, forecasting errors, xtended and long range forecasting and rain making. *Subject Headings:* **1. Weather forecasting . Weather lore 3. Lunar influences 4. Artificial precipitation. I. Schwerdtfeger, Werner.**—*G.T.*

9G–24 551.509.33

Ben Huset's weather forecast. First issue received, 1940; last issue received, 1954 (pub. **1953**). Minot, N. Dakota. Annual. Early issues mimeographed. Price: $2.00. **DWB** (incomplete oldings)—The author of this long-range forecast publication claims ability to foretell for a year or nore "what weather to expect in a Weather Bureau Division or a state." His method is based on

periodicities (ranging from a few days to several years) determined by planetary constellations. He attributes only minor weather changes to lunar influences but declares that "the major planets account for our long wet or dry periods." The forecasts are given for every month a year ahead and include general indication of expected temperature, wind, storms, precipitation, earthquakes, tidal waves, volcanic eruptions and other events. The forecast area is the Mississippi Valley extending over 17 states. *Subject Headings:* **1. Long range forecasts. I. Huset, Ben.**—*G.T.*

9G–25 551.509.21:621.39(

Brooks, Charles F., **What of the winter? Text of broadcasts . . . over WGBH-FM in Why the Weather? series, from Blue Hill Observatory, Dec. 4 and part of that planned for Dec. 11, 1953.** 3 p. Mimeo. **DWB**—Various methods of seasonal forecasting are discussed in connection with the forthcoming winter. After statistical considerations as to cold or mild weather to be expected the lecturer concludes on a humorous note denying the feasibility of reliable seasonal forecasts. *Subject Headings:* **1. Weather broadcasting 2. Winter weather 3. Popular meteorology 4. Seasonal forecasting.**—*G.T.*

9G–26 551.509.34:551.506

*Dexter, R. V., **An investigation of statistical outlooks for Halifax.** *Canada. Meteorological Division, Circular* 2327, Tec. 157, July 14, **1953.** 7 p. 2 tables. **DWB**—On the basis of 52 years of record available for Halifax, the author presents a table of statistical probabilities of (a) rainy (b) cloudy and (c) sunny days for the 1st and 15th day of each month. In another table he gives similar probabilities for the 2nd, 3rd, 16th and 17th day of the month in relation to the weather of the 1st and 15th. The tables are offered as aids to extended forecasting whenever synoptic methods fail to produce conclusive indications. A few suggestions and examples of application are added to the statistical material. *Subject Headings:* **1. Local forecasting 2. Objective forecasting 3. Meteorological statistics 4. Halifax, Canada.**—*G.T.*

9G–27 551.509.33:551.577.38

Floyd, Ross, **Floyd forecast for 'fifty four weather.** *The Farmer-Stockman*, Oklahoma City, Okla., 56(12)10, 32–33, Dec. **1953. DWB**—Duration (in months) of droughts in Oklahoma since 1885, are analyzed and a prediction made that the current (as of Oct. 1953) drought would end about Jan. 1954. The writer made a similar forecast a year earlier (i.e., that 1953 would be dry) and was justified. He attempts to show that most long droughts last very nearly 2 years. A table gives the pertinent statistics of the 9 driest periods from 1886–87 to 1952–53. The worst was 1909–11 with 30 in. deficiency over 31 months (of which 27 were below normal in precipitation), giving a 35% moisture deficiency. Every drought started in winter half of year. Up to date there had been 12.5 in. deficiency in 21 months. *Subject Headings:* **1. Drought duration 2. Drought forecasts 3. Oklahoma.**—*M.R.*

9G–28 551.509.33:551.524.33/4(521.53)

Hiramitsu, H., **On the change of air temperature at Gifu.** *Journal of Meteorological Research*, Tokyo, 4(12):1021–1024, March **1953.** fig., table, 2 eqs. In Japanese; English summary p. 62. **DWB, DLC**—Moving averages of monthly mean temperature 1913–50 show a secular increase with a superposed 9–10 year cycle. Forecast monthly temperatures Jan. 1951–May 1952 are compared with observed. *Subject Headings:* **1. Temperature periodicities 2. Temperature trends 3. Seasonal forecasting 4. Japan.**—*C.E.P.B.*

9G–29 551.509.33

Kobayashi, Teisaku, **A note on the long period forecasting by means of harmonic analysis, Pt. 3.** *Low Temperature Science*, Sapporo, Japan, No. 9:69–82, **1953.** 7 figs., 7 refs., 3 eqs. In Japanese; English summary p. 82. **DWB**—IMAHORI's approximate procedure of the prediction, which has previously been formulated and applied with fruitful results, was improved by the use of somewhat modified methods of determination of the initial values, including NAKATA's moving average method, and compared with the previous results. These new methods proved to be more efficient. The relative merits of these methods were also discussed. *Subject Headings:* **1. Long range forecasting 2. Harmonic analysis.**—*Author's abstract.*

9G–30 551.509.33:551.509.8

†Okuta, M., **Empirical rules on seasonal weather forecasting.** *Journal of Meteorological Research*, Tokyo, 5(4):297–328, April **1953.** 5 figs., 14 tables, refs., eq. In Japanese; English summary p. 297. **DLC, DWB**—The author undertakes (1) a statistical survey (according to subject matter) of some 600 weather maxims and (2) a classification and review of Japanese and world literature on correlation coefficients of various meteorological elements and of weather phenomena in various

geographic areas. Particular attention is paid to the persistence of anomalies. *Subject Headings:* **1. Seasonal forecasting 2. Weather maxims 3. Singularities 4. Correlation coefficients.**—*G.T.*

9G–31 551.509.33:519.2

Takahashi, K., **Representation of the seasonal weather changes.** *Journal of Meteorological Research*, Tokyo, 5(4):231–264, April **1953.** 12 figs., 20 tables, refs., 70 eqs. In Japanese; English summary p. 231. **DLC, DWB**—For the purpose of future studies and projects connected with seasonal forecasting, the meaning of seasonal weather change is clarified. Seasonal weather forecasting is defined as the forecasting of the average progress of weather for a certain future period. Seasonal weather changes are expressed as: $\theta(t) = \Theta(t) + \Delta\theta$, where θ is a certain element of seasonal weather, Θ the normal value of that element, $\Delta\theta$ the deviation from normal. The time variation of $\Delta\theta$ is complicated, but it is continuous in time and space and the prevailing period of the time variation is about 4 days. It is shown that by taking 5-day mean values, the short-period changes are smoothed and the seasonal weather changes expressed quite simply. *Subject Heading:* **1. Seasonal forecasting.**—*From author's abstract.*

9G–32 551.509.3:551.513:551.583

Takahashi, K. and collaborators, **Reviews of seasonal weather forecasting.** *Journal of Meteorological Research*, Tokyo, 5(4):195–204, April **1953.** 17 refs. In Japanese; English summary p. 195. **DLC, DWB**—This article is an introduction to a collection of 10 papers prepared under the auspices of the Meteorological Research Institute of Japan. The papers are reviews of progress achieved in connection with different problems related to seasonal forecasting, as reflected in Japanese and world literature. An outline of the extensive study and contents of the reviews are given in this introduction. The first 4 of the 10 papers are included in this issue of *Journal of Met. Res. Subject Headings:* **1. Seasonal forecasting 2. Progress in weather forecasting.**—*G.T.*

9G–33 551.509.33:551.524

Utsumi, T., **A method of seasonal forecast using the monthly pressure deviation observed at Mt. Iwate in Tohoku District.** *Journal of Meteorological Research*, Tokyo, 4(10):741–744, Feb. **1953.** fig., table, ref. In Japanese, English summary p. 47. **DLC, DWB**—Monthly deviations of pressure from normal, smoothed over 10 months, show a rough periodicity of 28 months, from which variations can be extrapolated. A falling curve generally brings temperature below normal and a rising curve above normal, giving a basis for seasonal temperature forecasts for Tohoku. *Subject Headings:* **1. Seasonal temperature forecasting 2. Tohoku District, Japan.**—*C.E.P.B.*

9G–34 551.509.33

Van Ornum, Delbert G. (*North Am. Weather Consultants, Pasadena, Calif.*), **Crystal ball viewed long range.** *Electrical West*, San Francisco, Calif., 110(3):77–78, March **1953.** 2 figs. **DLC**—After a brief critical review of four different approaches to the problem of long-range weather forecasting (e.g., the methods based on (1) solar radiation, (2) periodicities, (3) analogy and (4) weather patterns), the author briefly discusses a forecasting technique which is being developed by North American Weather Consultants. The technique would involve a combined evaluation of solar radiation fluctuations, pulsations of the atmosphere, partial analogs and weather patterns. *Subject Headings:* **1. Long range forecasting 2. Forecasting techniques.**—*G.T.*

9G–35 551.509.33(09)

Watanabe, T., **History of long-range forecasting studies.** *Journal of Meteorological Research*, Tokyo, 5(4):205–230, April **1953.** fig., table, refs. In Japanese; English summary p. 205. **DWB, DLC**—The history of long-range forecasting studies is summarized under the following headings: (1) Ancient long range forecasting and astrometeorology in Greece, Europe, China and Japan. (2) Weather periodicity, especially works of the Leipzig school. (3) Correlation method. (4) Influences of moon and stars. (5) Influences of oceans. (6) Methodology in the study of long range forecasting. (7) Development of the studies of long range forecasting in Japan. *Subject Headings:* **1. Long range forecasting 2. History of meteorology.**—*Author's abstract.*

1954

9G–36 551.509.33

Hiyama, K. and Endo, Y., **Empirical rules on seasonal weather forecasting.** *Journal of Meteorological Research*, Tokyo, 6(6):184–187, July **1954.** ref. In Japanese. English summary p. 184. **DWB, DLC**—Among many useful methods of seasonal weather forecasting, the authors pick up some empirical rules in terms of the following: (1) Effective rules for all seasons. (2) Rules on summer temperature. (3) Rules on winter temperature. (4) Rules on precipitation and others. *Subject Heading:* **1. Seasonal forecasting.**—*Authors' abstract.*

9G–37 551.509.33:551.511:551.513.1

Klein, William H. and Leight, Walter G. (*Extended Forecast Sec., U. S. W. B., Wash., D. C.*) **Usefulness of momentum flux for predicting the zonal westerlies.** U. S. Weather Bureau, June **1954.** 8 p. 3 tables, 10 refs. **DWB**—LORENZ's (1952) equation (*see* 3.9–95, Sept. 1952, *MAB*) is applied to the 5-day forecast operations of the U. S. W. B. Extended Forecast Section. The parameter $U+1/2t$, which yielded highest correlation was computed twice a week for 19 weeks from Feb. 7 through June 25, 1952. (Momentum flux was measured across 50°N from average 700 mb heights at 45° and 55°N.) Regression method was used to check value of method, and though correlation coefficient values were lower than LORENZ's and did not show much improvement over regression equations from past data, it should give good predictions of zonal wind speeds, and supports underlying principles set forth by STARR (1948). *Subject Headings:* **1. Zonal wind forecasting 2. Extended forecasting 3. Momentum flux.**—*M.R.*

9G–38 551.509.33:63

Krick, Irving P. et al., **Your weather.** *Farm Journal*, Philadelphia, 78(3):12, March **1954.** 30-day forecast chart. **DWB**—In this monthly feature, KRICK answers questions presented by farmers, regarding simple facts in meteorology and then presents his 30-day forecast (in this case for Feb. 20–March 20) for (a) the upper Midwest, (b) lower Midwest, (c) eastern Great Lakes and (d) North Atlantic seaboard. Each forecast is characterized by a colored block (in a time graph for the 30 days) showing what periods are expected to have abnormal snow, rain, warm or cold weather, and a paragraph describing general features of weather. A single sentence forecast is given as an "Outlook for April," representing a generalized 60-day forecast.. *Subject Headings:* **1. Long range forecasts 2. Agricultural meteorology.**—*M.R.*

9G–39 551.509.33

Seki, K., **A method of extended forecasting, Pt. 2.** *Journal of Meteorological Research*, Tokyo, 6(1/3):57–59, March **1954.** 4 figs., table. In Japanese; English summary p. 57. **DWB, DLC**—Following the first report (*see* 6.2–80, Feb. 1955, *MAB*) the annual variation of weather, the difference of weather in daytime and night, and the stability of weather were investigated by using the numerical representation of weather. It follows, in view of the weather change, fair weather is apt to occur at night and not in daytime, and also rainfall is apt to occur at night and not in daytime. *Subject Headings:* **1. Extended forecasting 2. Objective forecasting.**—*Author's abstract.*

9G–40 551.509.33:551.524.35

Smedley, David, **Suggested methods for estimating the monthly mean surface temperature anomaly midway during the period.** U. S. Weather Bureau, Dec. **1954.** 8 p. 3 refs. **DWB** (M09.53 U587s)—Tests show that continuity of error and regression temperature estimates are superior methods to the objective temperature method of estimating monthly anomaly from $\frac{1}{2}$ month data for 25 stations as is now in practice at the U. S. W. B. Extended Forecast Section. The regression temperature method gave best results but does not consider height pattern associated with temperature pattern as does the continuity of error method. Use of these methods is recommended for routine operational work. Details of methods and skill scores for original 10 cases, and 6 additional cases are tabulated. *Subject Headings:* **1. Temperature anomaly calculation 2. Extended forecasting 3. Objective temperature anomaly estimates. I. U. S. Weather Bureau Extended Forecast Section.**—*M.R.*

9G–41 551.509.33

Sugii, A., **A method of daily weather forecasting of the following month.** *Journal of Meteorological Research*, Tokyo, 6(6):188–190, July **1954.** 2 figs., 3 tables. In Japanese; English summary p. 188. **DWB, DLC**—Detailed forecasts of the weather for the following month are attempted by a sequential analog method. Forecasts for Dec. 27, 1952 to Jan. 3, 1953 are prepared by way of illustration (accompanied by generalized synoptic charts and data). *Subject Headings:* **1. Long range forecasting 2. Japan.**—*M.R.*

9G–42 551.509.33:551.543.3

Takahashi, K. et al. (*Met. Res. Inst., Tokyo*), **Studies on the seasonal weather forecasting, Pt. 2.** *Papers in Meteorology and Geophysics*, Tokyo, 3(1):26–40, March **1952.** 18 figs., 2 tables, 10 refs., 17 eqs. Also: **Pt. 3: Verification of an experimental seasonal weather forecasting.** *Ibid.*, 4(1):1–16, April **1953.** 15 figs., 7 tables, 11 refs. Also: **Pt. 4: Prognosis and weather types of 5-day mean 700 mb chart.** *Ibid.*, 5(1):1–7, April **1954.** 22 figs., 5 tables, 5 refs., 10 eqs. **DWB**—In **Part 2,** predominating periods of daily and 5-day mean pressure are investigated by harmonic analysis and marked periodicities ranging from 4 to 65 days are identified and interpreted in terms of planetary waves. Applications to long range forecasting are included. **Pt. 3** reports a successful forecast of 5-day mean temperatures for 80 days on the basis of 20, 25, 35 and 65-day periodicity in the pressure

nd temperature change. The 25-day weather periodicity is explained by a periodicity of the same ngth in solar activity. According to **Pt. 4** prognostic charts of 5-day mean 700 mb height were repared and found useful for predicting 5-day mean temperature and pressure change. *Subject leadings:* **1. Seasonal forecasting 2. Extended forecasting 3. Pressure variations 4. Periodicities 5. Harmonic analysis 6. Japan.**—*From authors' abstracts.*

9G–43 551.509.33:551.577.33(523)

Tanabe, S., **Periodogram analysis on precipitation in the drainage basin of power stations in Shikoku.** *Journal of Meteorological Research*, Tokyo, 6(6):191–195, July **1954.** 3 figs., 5 tables. n Japanese; English summary p. 191. **DLC, DWB**—In this paper, the author investigated the ng range forecasting of precipitation in the drainage basin of power stations in Shikoku by using ie method of periodogram analysis. Frequency distribution of observed monthly precipitation is lmost identical with the normal distribution. And under the assumption of normal distribution ie precipitation can be divided into 7-classes as shown in Tables. The data used is taken from adotsu (60 year's obs.) and Kōchi (67 year's obs.) in the coastal region, and Nagasawa (39 year's bs.), Yuzuhara (56 year's obs.) and Yanase (29 year's obs.) in the drainage basin. Among the nalyzed periods, the 7-year period in Oct. is very remarkable at each station. The forecast value f precipitation for each month in the drainage basin is given. *Subject Headings:* **1. Long range recipitation forecasting 2. Periodogram analysis 3. Precipitation distribution 4. Shikoku, apan.**—*Author's abstract.*

9G–44 551.509.33:551.524.35

Van Ornum, Delbert G. (*North Am. Weather Consultants, Pasadena*), **Long range weather forecasting.** *Western Snow Conference, Salt Lake City, April 1954, Proceedings*, pub. **1954.** p. 4–9. figs., 3 refs. **DWB**—Hemispheric studies of general circulation blocking action, air flow axes and rographic effects have enabled some improvements to be made in seasonal forecasting. Examples re given from relation between the N.-S. airflow between 180 and 150 W. long. at 50 N. during Oct. nd subsequent Dec. and Jan. temperature anomaly at Spokane and Chicago, respectively. Theory that strong westerly flow at below normal latitude strikes mountain ranges and produces a low ltitude wave with warm winter in N.W. and cold in E., whereas if the westerlies strike at high latitudes ney dam up and flow down over N.W. from Alaska or Yukon Territory; and the East Coast is in ie warm return flow east of a long mid-continent trough. *Subject Headings:* **1. Long range forecasting 2. Temperature anomaly forecasts 3. Spokane, Wash.**—*M.R.*

1955

9G–45 551.509.33

Arai, Y. and Nakamura, N. (*both, Met. Res. Inst., Tokyo*), **The relationship between 5-day mean 700-mb anomaly chart and the weather change at the surface.** *Journal of Meteorological Research*, Tokyo, 7(11):711–716, Dec. **1955.** 2 figs., 14 refs. In Japanese; English summary p. 711. lso their: **On the relationship between 5-day mean 700-mb anomaly chart and the surface pressure attern (Studies on the seasonal weather forecasting, V, d).** *Papers in Meteorology and Geophysics*, okyo, 6(3/4):234–238, Jan. **1956.** 2 figs., 2 tables, 2 refs. **DWB, DLC**—The first paper contains otes on the behavior of cyclones, anticyclones, winds, etc. during the 5-day period following each f the various 500 mb anomaly types of K. Takahashi (1955). The second paper is a study on the elation between the surface weather maps and the standard types of 5-day mean 700 mb anomaly harts. 5-day mean anomaly charts on the 700 mb height and the weather change on the surface re closely correlated, and the frequency of the weather types on the surface for each of the standard ypes of 5-day mean 700 mb anomaly charts is obtained. The movement of cyclones, typhoons nd migrating anticyclones is described for the 700 mb anomaly charts. *Subject Headings:* **1. Extended forecasting 2. 5-day anomaly types. I. Takahashi, K.**—*Authors' abstract and M.R.*

9G–46 551.509.33:551.583

Arakawa, Hidetoshi (*Met. Res. Inst.*), **Meteorological conditions of the great famines in the st half of the Tokugawa period, Japan.** *Papers in Meteorology and Geophysics*, Tokyo, 6(2):101–5, Sept. **1955.** 8 figs., 6 tables, 12 refs., eqs. **DWB**—The first part of this paper deals with the eteorological conditions of the three great famines in Japan 1782~1787, 1833~1839 and 1866 1869. For this climatological chronology to have its maximum value reliable and quantitative ata are cited with care. The second part deals with four principal factors that may determine hat the climate for North Japan shall be. Violent eruptions, variation in the measured intensity solar radiation, solar activities and water temperature variation in the Northwest Pacific Ocean, e quite important as meteorological factors and have significance from a seasonal forecasting point view. It should be noted that these famines resulted from the coldness of the summer with un-

seasonable prolonged rains, while serious famines in India and other monsoon lands result when th rains are far below normal. *Subject Headings:* **1. Meteorological conditions for famine 2. Season forecasting 3. Climatic chronologies 4. Famines 5. Japan.**—*Author's abstract.*

9G–47 551.509.59:551.311.1

†Armstrong, Terence, **Soviet work on sea-ice forecasting.** *Polar Record*, 7(49):302–311, Ja **1955.** 40 refs. **DLC**—Research on ice forecasting in U.S.S.R. Arctic waters up to 1941 is describe the latest (1946) work by VIZE is not available. Early work by VIZE related break-up of ice t frequency and tracks of depressions or to pressure gradients. Other workers used strength of Arcti Gulf Stream, sea temperature, etc., but few definite relations have been found. Relations are ne discussed between ice drift and pressure gradients, between growth of sea ice and negative air tem perature, snow cover and salinity, and between thawing and temperature and snow cover. Lon term (4 months) and short term forecasts both had an average success of 75%. *Subject Heading* **1. Sea ice forecasting 2. Arctic Ocean 3. U.S.S.R.**—*C.E.P.B.*

9G–48 551.509.3

Asakura, T., **The relationship of anomaly chart of 5-day mean 700-mb height to anomaly c 5-day mean surface temperature.** *Journal of Meteorological Research*, Tokyo, 7(11):696–704, De **1955.** 4 figs., 3 tables. In Japanese; English summary p. 696. Also published as **The relationshi . . . (Studies on the seasonal weather forecasting V, b)** in *Papers in Meteorology and Geophysic* Tokyo, 6(3/4):221–227, Jan. **1956. DWB, DLC**—Rules for predicting the 5-day mean surfac temperature anomaly from the 5-day mean 700-mb height chart are worked out. Some of these ar 1. Positive 700 mb height anomaly is usually associated with positive surface temperature anomaly but *not* vice versa. Negative surface temperature anomaly usually correlates with cold air advectio and vice versa. 2. Correlation patterns for surface temperature and 700 mb height over East As are shown in chart. 3. Correlation between surface temperature at Tokyo and zonal index, meric ional index, vorticity, etc. are given. Zonal index and temperature correlations reverse themselve from summer to winter because of the reversal in continent-ocean temperature relationship. 4. 70 mb anomaly charts are classified into 8 warm and 5 cold types according to K. TAKAHASHI and IID (1955). *Subject Headings:* **1. Extended temperature forecasting 2. 5-day anomaly types 3. Japa I. Takahashi, K.**—*M.R.*

9G–49 551.509.3

Dué Rojo, Antonio (*Dir. Obser. of Cartuja, Granada*), **El pronóstico del tiempo a largo plaz** [Long range forecasting.] *Revista de Geofísica*, Madrid, 14(53):51–59, Jan./March **1955.** 9 ref **DWB, DLC**—Several current methods of long range weather forecasting are discussed: 1) hig atmospheric conditions and relation to sun, 2) oceanic currents, 3) statistical series, 4) solar cycle (11-year), 5) action of planets, and 6) volcanic dust. *Subject Headings:* **1. Long range forecastin 2. Forecasting techniques.**—*M.R.*

9G–50 551.509.3

Hess, Paul, **Probleme der Mittelfristvorhersage.** [Problems in medium range forecasting. *Germany. Deutscher Wetterdienst, Mitteilungen*, No. 10:50–58, Feb. **1955.** 5 figs. **DWB**—Th author explains and discusses the present methods of medium range forecasting, as well as th limitations of their applicability. They are the methods of: (1) analogs; (2) multiple correlatio tables; and (3) large scale weather situations, and each is discussed at length by the author. Th forecaster's work—the formulation of the forecast—begins when the results of the above mentione methods are in hand. He must determine how far the hints supplied by these methods agree, whe they disagree and which arguments should prevail. This can be done only when the meteorologi is familiar with the synoptic situation and is a statistician. The formulation of further (up to 5- day) outlooks proceeds in close collaboration with the meteorologists of the synoptic division an are issued for the whole West German region. Local indications should be made on the basis these general surveys by branch meteorological stations. The daily general weather situation (accordance with HESS-BREZOWSKY classification) is given at the conclusion of the forecast. *Subje Headings:* **1. Extended forecasting 2. Forecasting techniques.**—*A.M.P.*

9G–51 551.509.33:519.241

Hofmann, Alfred, **Entwicklungsarbeiten zur Mittelfristvorhersage.** [Development in mediu range forecasting.] *Germany. Deutscher Wetterdienst, Mitteilungen*, No. 10:59–60, Feb. **195** fig. **DWB**—The development of a new multiple correlation table in which the existing synopt experience in medium range forecasting will be statistically utilized, is in progress. It will consi of 2 main classes (zonal and meridional), and 10 sub-types from X_1 to X_{10}. A map of the Nor Atlantic and Scandinavia, indicating the 4 fields from which values for X_1 to X_8 at 500 mb lev height will be taken is presented. The value of X_{10} will be computed from 5 points in Scandinavi

Ks will be taken from HESS-BREZOWSKY's calendar of large scale weather situation. The 24, 48, 2-hour pressure variations over Europe will be introduced as dependent variables. If the table will yield satisfactory forecasts—the results will be combined with extrapolations of the 24-hour forecast map. They will not be available for a year. *Subject Headings:* **1. Extended forecasting 2. Correlation charts.**—*A.M.P.*

9G–52 551.509.33

Hofmann, Alfred, **Monatsvorhersagen.** [Monthly forecasts.] *Germany. Deutscher Wetterdienst, Mitteilungen*, No. 10:61, Feb. **1955. DWB**—Monthly forecasts of temperature and precipitation issued by the group F/2 of the Frankfurt Center for the whole country including Berlin do not usually give any details as to space or time. They are based on available notations of characteristic phenomena of the previous weather (chronological method) and on a comparison with similar circulation anomalies in preceding months estimated according to deviations from the mean monthly air pressure distribution. Although the degree of their accuracy is not particularly high they are useful. *Subject Headings:* **1. Long range forecasts 2. Germany.**—*A.M.P.*

9G–53 551.509.31

Hummel, Fritz, **Verwendung des über Fernschreiber eingehenden Materials.** [Use of data obtained over the teletype.] *Germany. Deutscher Wetterdienst Mitteilungen*, No. 10:11–18, Feb. **1955.** 3 figs. **DWB**—A new method of using material and data obtained over the teletype by Meteorological Observatory meteorologists working in the synoptic field, who are mainly concerned with the preparation of medium range weather forecasts, is presented and discussed. It is based on the author's long experience at the Meteorological Observatory of Göttingen and in accordance with the motto: maximum delivery with the least expenditure of work and material. A list of indispensable material and working data obtainable over teletype is given, with remarks concerning their use and an hour by hour schedule of the work to be done by the local meteorologist is introduced. *Subject Headings:* **1. Extended forecasting 2. Teletype transmissions 3. Synoptic forecasting.**—*A.M.P.*

9G–54 551.509.318

Khrabrov, Iu. B., **O prognozakh na estestvennyĭ sinopticheskiĭ period.** [Forecasts for natural synoptic periods.] *Meteorologiia i Gidrologiia*, Leningrad, No. 6:7–12, Nov./Dec. **1955.** fig., 2 tables, 9 refs. Also: Pagava, S. T., **O sinopticheskom metode sostavleniia dolgorochnykh prognozov pogody maloi zablagovremennosti.** [Synoptic method for making long range weather forecasts of short duration.] *Ibid.*, No. 6:61–63, June **1956. DWB, DLC**—The present procedure for forecasting weather several days in advance is based upon three forecasting premises. These include the use of (1) the forecasting properties of the natural synoptic period consisting of the fact that the constant orientation of the synoptic processes persists when the sign of the principle pressure fields persist, (2) the quasi-constant persistence of the natural synoptic period and (3) a series of rules for forecasting synoptic processes in a succeeding natural synoptic period. The validity of these prognostic premises is examined in order to determine the strong points of this method of forecasting for 3-day periods. PAGAVA rejects KHRABROV's conclusions which are critical of the natural synoptic period established by MULTANOVSKIĬ for his long range forecasts. *Subject Headings:* **1. Natural synoptic periods 2. Forecasting techniques 3. Long range forecasting.**—*I.L.D.*

9G–55 551.509.33:551.543.3

Kikuchi, T. and Yoshida, H., **On a characteristic feature of pressure variation at point "X-Ray" and its application to 7-day forecast.** *Journal of Meteorological Research*, Tokyo, 7(2):68–70, March **1955.** 3 figs. In Japanese; English abstract p. 68. **DWB**—The variation of air pressure at the ocean ship weather station "X-Ray" corresponds well to the variation of air pressure 10 days later at Atbasar (52°N, 68°E), and this characteristic feature is useful for 7-day forecasting at Muroran, Hokkaido. Results of actual 7-day predictions show that this approach can be used as an aid in the forecasting, especially in summer season. *Subject Headings:* **1. Long range forecasting 2. Pressure variations 3. Weather Ship "X-Ray" 4. Muroran, Hokkaido, Japan.**—*Authors' abstract.*

9G–56 551.509.33:551.577

§Koo, Chên-Chao, **Opyt sostavleniia pognozov letnikh osadkov dlia territorii kitaia na estestvennyĭ sinopticheskiĭ period.** [Experience gained in the compilation of forecasts of summer rains for the territory of China for the natural synoptic period.] *Scientia Sinica*, Peking, 4(2):307–312, June **1955.** 10 figs. At head of article: Gu Chzhen'Chao. Chinese version issued in *Acta Meteorologica, Sinica*, 26(1/2), June **1955. DLC.** English translation available. Special Libraries Association, Translation Center, as No. 57–775.—In 1950–1953, the ROSSBY-NAMIAS method of extended forecasting was used in China (based on 700 mb baric topography charts). In 1953 the

MULTANOVSKIĬ-PAGAVA method (using natural synoptic periods) was adopted and adapted to China. Manchuria and vicinity, using charts as far west as the Urals (60°E) and to 170°E in the Pacific. The system is applied to quantitative and qualitative precipitation forecasting for China. A synoptic example is given for 14–18 July, 1954 using data for July 10–11, 1954. The forecast chart shows precipitation of >200 mm in the Shanghai region and to the west. The verification chart shows a maximum of 150–200 mm in spots. *Subject Headings:* **1. Extended precipitation forecasting 2. Mul'tanovskiĭ-Pagava method 3. Natural synoptic periods 4. China.**—*M.R.*

9G–57 551.509.33:551.524.3

Long Range Weather Consultants, Boston, **Temperature forecast for April.** *Air Conditioning, Heating and Ventilating*, N. Y., 52(4):114–115, April **1955.** diagr. Regular feature with a 90 day forecast every third quarter. Also **Temperature forecast for December.** *Ibid.*, 52(12):104, Dec. **1955.** Also **Temperature forecast for winter.** *Ibid.*, p. 105. map. Also **Temperature forecast for January.** *Ibid.*, 53(1):90, Jan. **1956.** map. **DWB, DLC**—Map of U. S. shows areas forecast to be above or below normal, much above or much below normal, and near normal. Forecasts are made by Long Range Weather Consultants of Boston, consisting of H. C. WILLETT, I. I. SCHELL and WILLIAM C. MORTON, III. Text describes briefly the general features expected in the various broad sections of the country. *Subject Headings:* **1. Long range temperature forecasts 2. United States.**—*M.R.*

9G–58 551.509.33:518.5

Mintz, Yale, **On heating models for extended- and long-range numerical weather forecasting and the study of the general circulation.** California. Univ. at L. A. Dept. of Meteorology, Contract AF 19(604)-1286, Scientific Report, No. 2, Nov. **1955.** 20 p. 15 refs., 4 eqs. This report also found in the **Final Report,** June 30, 1957.—The discussion centers on the two parameter models $Q' = Q_c + (Q'_{L_1} + Q'_{L_2}) + Q'R$ with Q'—rate of individual nonadiabatic heating, Q_c—heat conduction through air-ground interface, Q'_{L_2} and Q'_{L_1}—release of latent condensation heat by large scale ascent and other types of motion, Q'_R—rate of heating radiation (least variable). The air-ground heat transfer is the most important clue to a rational approach to the general circulation and long range numerical weather forecasts. *Subject Headings:* **1. Heating models 2. Numerical long range forecasting 3. General circulation.**—*A.A.*

9G–59 551.509.33:551.524.3:551.524.2(73)

Nagao, T., **Characters of weather group and its application to long-range weather forecasting, Pt. 7.** *Journal of Meteorological Research*, Tokyo, 7(3):177–182, March **1955.** 2 figs., table, 3 refs., eqs. In Japanese; English summary p. 177. **DWB**—In the present paper, the author has discussed some characteristic features of the distribution of interdiurnal variability of air temperature in the United States, and the following results are obtained: (1) A statistical linear relation between the interdiurnal variability (x) and number of isothermal line (n) drawn at 10°F interval across the United States is obtained: That is, $x = an + b$, where a and b are constants. (2) Relationship between the monthly range of air pressure and anomaly of interdiurnal variability of air temperature is obtained. (3) The interdiurnal variability of air temperature is approximately proportional to the temperature gradient. (For other papers in this series *see* 7.5–150, May 1956, 9G–9 and 9G–87.) *Subject Headings:* **1. Interdiurnal temperature variations 2. Long range forecasting 3. United States.**—*Author's abstract.*

9G–60 551.509.33:551.513.7

§Péczely, György, **A téli évszak makroszinoptikai előrejelzésének néhány problémája.** [A few problems in macrosynoptic forecasting for the winter season.] *Beszámolók az 1955-ben végzett tudományos kutatásokról* (Issued as *Hungary. Országos Meteorológiai Intézet, Hivatalos Kiadványai*, Vol. 20, pub. **1955**). p. 220–227. 5 figs., 3 tables. Russian and German summaries p. 220. **DWB**—Atlantic pressure charts (surface and 500 mb) for Jan. 13–18, 1950 and a chart of anticyclone tracks for Jan. 11–24 appear to indicate a close relationship between polar outbreaks over America and anticyclogenesis over Scandinavia, which, in turn influences winter weather in Hungary. Possible connections with Siberian cold centers are also discussed. *Subject Headings:* **1. Atmospheric circulation anomalies 2. Long range forecasting 3. Hungary.**—*G.T.*

9G–61 551.509.318:551.509.33

Shishkov, V. G., **Roĭ'nekotorykh priznakov tekushchego estestvennogo sinopticheskogo perioda dlia prognoza sleduiushchego estestvennogo sinopticheskogo perioda.** [The role of some characteristics of the current natural synoptic period in forecasting the subsequent natural synoptic period.] *Meteorologiia i Gidrologiia*, Leningrad, No. 4:28–31, July/Aug. **1955.** table, ref. **DWB**—The actual significance of various characteristics of the current natural synoptic period and of the preceding natural synoptic period established by PAGAVA for forecasting a subsequent natural synoptic period are examined by an analysis of analogous and non-analogous natural synoptic periods. It is

oncluded that in order to forecast processes and weather on subsequent natural synoptic periods it is ecessary that the preceding synoptic periods should have developed for a sufficient time before the eriod to be forecast and over an area greater than the natural synoptic area. *Subject Headings:* **. Natural synoptic periods 2. Synoptic forecasting 3. Extended forecasting.**—*I.L.D.*

9G–62 551.509

Steinhauser, F. (*Vienna*), **Möglichkeiten und Grenzen der modernen Wettervorhersage.** [Possibilities and limits of modern forecasting.] *Wetter und Leben*, Vienna, 7(8/11):169–175, **1955.** refs. **DLC**—The author presents a general discussion of the difficulties and limitations inherent n weather forecasting. A conflict exists between space and time: the smaller the area or the more estricted the meteorological physical process the more difficult is the prediction of the time of ccurrence of specific events. The forecaster can only handle a statistical sample of available data which cannot yield information concerning precise events. Local influences are superposed over arge scale circulation processes. Recent progress in observations of the free atmosphere in theory nd in numerical calculation methods are pointed out as promising improvements in short range orecasting. The differences between daily, medium range and long range forecasts are pointed out nd the principles used in the latter two are discussed in general terms. *Subject Headings:* **1. Forecasting limitations 2. Progress in weather forecasting 3. Forecast improvements.**—*I.L.D.*

9G–63 551.509.33

*Takahashi, K. and Iida, M., **Classification of 5-day mean 700-mb anomaly charts for the East sia.** *Journal of Meteorological Research*, Tokyo, 7(11):687–695, Dec. **1955.** 2 figs., 5 tables. In apanese; English summary p. 695. Also published as **Classification of 5-day . . . (Studies on the easonal weather forecasting V, a)**, in *Papers in Meteorology and Geophysics*, Tokyo, 6(3/4):213–220, an. **1956.** 2 figs., 3 tables. **DWB, DLC**—5-day mean 700 mb anomaly charts for the Far East re classified into 21 types (after NAMIAS, BAUR and ELLIOTT). Frequencies of the charts for each ype show marked annual change. The persistence and the transition probability between the ypes have been calculated. *Subject Headings:* **1. Seasonal forecasting 2. Pressure anomalies . Far East.**—*Authors' abstract.*

9G–64 551.577.33:551.509.33

Tannehill, Ivan R., **Is weather subject to cycles?** *U. S. Dept. of Agriculture, Water: the Yearook of Agriculture, 1955*: 84–90. pub. **1955.** figs., 3 refs. **DWB, DA**—It is concluded that there re no true cycles in rainfall, but only certain rhythmic variations whose physical basis is not yet ully understood. Several graphs are presented to show (a) cyclical pattern of Oklahoma rainfall rom 1886–1951, (b) use of analogs to predict Nov. 25, 1950 storm in Middle Atlantic States, (c) trend oward warmer winters at New Haven since 1870, (d) rhythmic difference between Galveston and marillo, Tex. rainfall from 1890–1950. These graphs can be made to appear cyclical if enough moothing has been done, but they are of questionable value in long range forecasting unless synoptic harts are also used as the basis for the forecast. *Subject Headings:* **1. Precipitation cycles 2. Long ange precipitation forecasting.**—*M.R.*

9G–65 551.509.33:551.465(52)

Uda, Michitaka, (*Tokyo Univ. of Fisheries*), **The fluctuation of Oyasiwo current in relation to the tmospheric circulation and to the distribution of the dichothermal waters in the North Pacific Ocean. (Researches on the fluctuations of the North Pacific circulation, Pt. 1.)** *Records of Oceanographic Works in Japan, Tokyo, n.s.*, 2(2):43–55, Oct. **1955.** 17 figs., table, 13 refs. **DWB**—The leutian Low is considered to be an important control of the Oyashio Current and the production f cold water masses in the N.W. Pacific. The winter monsoon and Siberian High also affect the egree and extent of the cold current. The dynamics and mechanism of this current is analyzed in elation to the atmospheric circulation in the area. The mean pressure for each Feb. 1931–1934 shown in charts and used to calculate pressure difference from Siberian High to Aleutian Low and orrelate them with cool summers of 1931 and 1934 and warm summers of 1932 and 1933. *Subject leadings:* **1. Oyashio Current anomalies 2. Seasonal forecasting 3. Cool summers, Japan 4. Japan.**—*M.R.*

9G–66 551.509.33:551.583.13

U. S. Air Weather Service, **Evaluation of M. Grappe's extended period forecasting technique.** s *Technical Report*, 105–134, May **1955.** 20 p. 16 figs. **DWB**—Tests made in Nov. 1953–July 954 by the U. S. Air Weather Service, indicated that ROGER GRAPPE's method of singularity forecasting for 5 days, or a modified Grappe method employed by the A.W.S. for Eastern Atlantic and Western Europe, showed much better verification than climatology or persistence, or conventional ethods of extended forecasts. Thirty day forecasts by the Grappe method require much more asic climatic data and do not show the skill, unless it be the subjective skill of the forecaster, that

the extended forecasts do. *Subject Headings:* **1. Singularity forecasting 2. Extended forecasting verification 3. Grappe's method. I. Grappe, Roger.**—*M.R.*

9G–67 551.509.33:551.590.2

Willett, Hurd C., **I predict the weather for 1955.** *Look*, Des Moines, Iowa, 19(1):26–29, Jan. 11 **1955.** illus., port. **DLC**—A colorful, 2-page map of the U. S. shows the predictions made by Willett for winter, spring, summer and autumn for the Pacific Northwest, the Southwest, Northern Plains, Southern Plains, Lakes, Gulf, Northeast and Southeast parts of the country. The northeastern states are expected to have a cold snowy winter, and the S.E., cold and wet. The Plains will be warm and dry in summer. Details for 68 leading cities in all sections of the U. S. are given in terms of seasonal anomalies of temperature and precipitation. Willett is said to have developed his system at M.I.T. during the past 18 yrs., and has based it on effects of solar variations on the general circulation of atmosphere. He claims the forecasts will verify 3 times out of 4. *Subject Headings:* **1. Long range forecasts 2. Solar-atmospheric relationships 3. United States.**—*M.R.*

1956

9G–68 551.509.33:551.509.318

Ambrózy, Pál, **A természetes szinoptikus periódusokról.** [Natural synoptic periods.] *Időjárás*, Budapest, 60(4):254–256, July/Aug. **1956.** fig., 10 refs. **DLC**—There have been numerous discussions about natural synoptic periods and especially about their use in extended forecasting. In this paper, different authors' opinions concerning natural synoptic periods are reviewed (Pagava, Khrabrov, Shishkov). Natural synoptic periods are found to be useful, within certain limits, in establishing large scale synoptic types and preparing extended forecasts. *Subject Headings:* **1. Natural synoptic periods 2. Extended forecasting.**—*G.T.*

9G–69 551.513:551.509.33

Ando, M., **General circulation observed from the variations of the mass of air over the Northern Hemisphere, Pt. 2.** *Journal of Meteorological Research*, Tokyo, 8(9):541–551, Oct. **1956.** 16 figs., 2 tables, 11 refs., 2 eqs. In Japanese; English summary p. 541. **DWB, DLC**—Also: Kamiko, T. **(Comments on above paper) (and) reply by Ando.** *Ibid.*, 9(6):451–452, July **1957.** 4 figs. **DWB**—Inspecting the variation of 5-day means of the mass of air over latitude bands (10° lat. in width) in the Northern Hemisphere for the period from 1930 to 1934, a prevalent meridional circulation is found between the lat. 70° band and the lat. 40° band in the hemisphere. This meridional circulation is conspicuous in the eastern parts of the Pacific Ocean. Further, a large export of the mass of air from middle latitudes to high latitudes takes about two months, and such export from middle latitudes is apt to occur in spring, which often brings a cool summer in Japan. In view of the fact revealed above, it may be concluded that the Azores anticyclone and the Pacific anticyclone may predominate above normal in the preceding winter season of a cool summer in Japan. The meridional circulation which occurs on a large scale in the eastern parts of the Pacific and Atlantic Oceans might be associated with Walker's oscillation and with the two greatest blocking phenomena observed in these high-latitude areas. It is shown that most of severe cold winters during the period 1921 to 1940 are associated with below normal pressures at Horta and Honolulu and with above normal pressures at Akureyri and Barrow in cold seasons. But, in general, it cannot be said that there is an intimate relation between the winter temperatures in Japan and the conditions of the Azores and Pacific anticyclones. (For Pt. 1 *see* 8.8–200, Aug. 1957, *MAB.*) *Subject Headings:* **1. Seasonal forecasting 2. Atmospheric circulation anomalies 3. Japan.**—*Author's abstract.*

9G–70 551.509.33

Arizumi, N. (*Central Met. Obs., Tokyo*), **One method of extended-range forecasting.** *Geophysical Magazine*, Tokyo, 27(2):249–254, March **1956.** 6 figs., 2 refs., 5 eqs. **DWB, DLC**—The daily distribution of the absolute vorticity on the 700 mb surface along the 140°E meridian is forecast from that along the 60°E meridian by assuming the conservation of the potential absolute vorticity, potential temperature and horizontal divergence of an air mass, and then is compared with the daily pressure distribution along the 140°E meridian. This method serves as a reference in forecasting daily weather in Japan for one week in advance. *Subject Headings:* **1. Extended forecasting 2. Air mass analysis.**—*Author's abstract.*

9G–71 551.509.33:551.57

*Calatrava, Alonso, Jr., **Ensayo de pronostico de la precipitacion pluvial anual: estudio sobre el regimen pluvial de "La Trinidad" Maracay, Estado Aragua.** [Experiment in forecasting annual precipitation: study of the rainfall regime of La Trinidad, Maracay, State of Aragua.] *Caracas, Venezuela. Colegio de Ingenieros, Revista*, No. 241:22–31, April **1956.** 4 figs., 8 tables, 2 refs. **DWB**—Monthly, seasonal and annual rainfall, and year to year variations at Maracay, Venezuela

are analyzed graphically and statistically for the period 1926–46, and an attempt made to use the analysis for forecasting for the year from the dry season rainfall, etc. It is concluded that rainy years fall into groups of 3 yrs followed by 1, 2 or 3 dry yrs. Jan.–March is the dry season. If Jan.–April rainfall is known, the rainfall for the year can be forecast with some degree of accuracy. *Subject Headings:* **1. Long range precipitation forecasting 2. Seasonal forecasting 3. Rainfall statistics 4. Maracay, Venezuela.**—*M.R.*

9G–72 551.509.312

Elliott, Robert D., **The outlook for long-range weather forecasting.** *New York Academy of Sciences, Transactions,* 18(4):371–374, Feb. **1956. DLC**—A general discussion of the need for improving long range weather forecasting and the difficulties inherent in such forecasting, the testing of the accuracy of objective forecast techniques, numerical techniques in long range forecasting and the nature of objective forecasting. *Subject Headings:* **1. Objective forecasting 2. Numerical forecasting 3. Long range forecasting.**—*I.L.D.*

9G–73 551.509.33

Outstanding weather, Jan.–Dec. 1957. *Ford Almanac,* N. Y., 1957, issued **1956.** p. 78–83. charts (in color). **DWB**—A series of 12 "forecasts" for one week out of each month during 1957 and forecasts of winter (1956–57). Moisture and winter temperature are presented on maps of the U. S., each map showing general areas of anomalous conditions, and an accompanying verbal "almanac" type of forecast. Notes on hottest, coldest, wettest, driest and stormiest places (and dates) in the world are indexed. *Subject Headings:* **1. Long range forecasts 2. Almanacs 3. Weather extremes 4. United States.**—*M.R.*

9G–74 551.509.33(522.2):551.526.6

Fujita, M., **The seasonal weather forecastings at Tsushima based on oceanographical observations, Pt. 2.** *Journal of Meteorological Research,* Tokyo, 8(5):301–306, June **1956.** 6 figs., 3 refs. In Japanese; English summary p. 301. **DWB, DLC**—The author has investigated the relation between coastal surface water temperature and air temperature at Izuhara, Tsushima Island. The results obtained are as follows: (1) Coastal surface water temperature precede air temperatures, or, so far as the fluctuation of their amplitudes are concerned, the variation of the former corresponds, with a marked negative correlation, to that of the latter a few months later. (2) Positive correlations, of short continuance are rarely observed among the above negative ones, and it seems possible to forecast these positive correlations by examining the variation of coastal surface water temperatures. (3) From the recent trend of water temperature, it is deduced that a severe cold will be experienced in the Tsushima district in the coming winter of 1956, especially in Dec. and Jan. *Subject Headings:* **1. Severe winter weather forecasting 2. Air-sea temperature relationships 3. Tsushima district, Japan.**—*Author's abstract.*

9G–75 551.509.59:551.311.182

Ginzburg, B. M., **O metodike dolgosrochnykh prognozov zamerzaniia i vskrytiia rek.** [Method of long range forecasting of river freeze-up and break-up.] *Meteorologiia i Gidrologiia,* Leningrad, No. 2:10–14, Feb. **1956.** table, 14 refs. **DWB, DLC**—The history of various methods developed in the U.S.S.R. for long range forecasting of the freezing and break-up of river ice is summarized. The author illustrates the application of the forecasting technique involving heat exchange in the atmosphere-ice-water system and the hydrological characteristics of the rivers to the ice breakup in various rivers of European U.S.S.R. and eastern and western Siberia and the use of local index of meridional circulation on the basis of AT_{700} charts and discusses the reliability of long range forecasts involving atmospheric synoptic periods. *Subject Headings:* **1. Long range forecasting 2. Ice breakup forecasting 3. Freezing of rivers 4. Forecasting techniques 5. U.S.S.R.**—*I.L.D.*

9G–76 551.509.33:551.513.2

Glaser, Arnold H., **Use of basic general circulation patterns in extended and long-range forecasting, with an appendix by William W. Hildreth, Jr.** Texas Agricultural and Mechanical College. Dept. of Oceanography and Meteorology, Contract AF 19(604)-1301, Final Report, Dec. **1956.** 19 p. 3 figs., 8 tables, 5 refs. **DWB**—Tests were made for persistence and homogeneity of the 700 mb and 500 mb wave number (number of troughs in jet stream) for 1946, 1947 and 1952–55, incl. It was found that persistence does not extend beyond the 7th day, and in fact was not significant much beyond the 2nd day, making it of very little use in long range forecasting. The spectrum of wave numbers is not homogeneous from year to year, even allowing for persistence. There seemed to be a good correlation between variability from day to day, or in lack of persistence and sunspot number. *Subject Headings:* **1. Long range circulation pattern forecasting 2. Hemispheric wave number 3. Persistence of wave number. I. Hildreth, William W., Jr.**—*M.R.*

9G–77 551.509.33

Grappe, R. (*Ing. de la Met.*), **Contribution a l'étude de la prévision saisonnière.** [Contribution to the study of seasonal forecasting.] *La Météorologie*, Paris, Ser. 4, No. 41:29–54, Jan./March 1956. 13 figs., 17 refs. English and Spanish summaries p. 29. **DWB**—The author discusses the philosophical and methodological aspects of long range forecasting, summarizes various studies on seasonal forecasting, namely those of HELLMANN, MULTANOVSKIĬ, RODEWALD, J. SANSON, V. MIRONOVICH, and BESSON and GRISOLLET, presents statistical results relating to the intra- and inter-seasonal characteristics of the principal meteorological elements at Paris, and useful techniques for large scale and very large scale forecasting including the method of analogous curves, the method of symmetry, direct extrapolation, techniques based upon singularities, and method of extrapolation of variations. *Subject Heading:* **1. Seasonal forecasting.**—*I.L.D.*

9G–78 551.509.33:518.5

Hess, Paul, **Numerische Wettervorhersage: der einzige Weg, auf dem langfristige Wettervorhersagen möglich sind.** [Numerical weather forecasting: the only practical method for long range weather forecasting.] *Orion*, Munich, 11(5/6):248–250, March 1956. **DLC** (Q3.075)—The general principles of numerical prediction and the currently used techniques, machines used in the U. S. and Sweden and their limitations and the possibilities for extended forecasting and hopefully for longer periods are elucidated. Interpretation of flow patterns in terms of "weather" is still up to the meteorologist and will be for some time. *Subject Heading:* **1. Numerical long range forecasting.**—*M.R.*

9G–79 551.509

Kahan, Archie M. (*Texas A. and M. Res. Found.*), **Persistence and typical weather patterns.** *American Petroleum Institute, 36th, Chic. Nov. 1956, Proceedings*, Section 6/7:74–75, 1956. **DLC**—Methods used in short and long-term forecasting, involving calculation of persistence, or use of analogues, are discussed. Factors that produce persistence, and limitations of this and the analog method are outlined. Hope of improvement comes from increased knowledge through dishpan experiments and from use of electronic calculators. Analogs seldom persist for over a week or so, never for a whole month. Even with more and more "leniency" in defining an analog, it gets harder and harder to find one as the length of time passes a week. Slow progress should be expected. *Subject Headings:* **1. Persistence in long range forecasting 2. Analog forecasts.**—*M.R.*

9G–80 551.509.33

†Klein, William H. (*Ext. Forecast Sect., U. S. W. B., Wash., D. C.*), **The central role of the height anomaly in the outlook for long-range weather forecasting.** *New York Academy of Sciences, Transactions*, 18(4):375–387, Feb. 1956. 9 figs., 20 refs. **DLC**—The author discusses the change of emphasis in the techniques of preparing long range forecasts since development at M.I.T. in the late 1930's. The zonal index, the planetary wave, the jet stream and the 700 mb height anomaly are considered. The use of the 700 mb height anomaly is illustrated and specific examples are given. *Subject Headings:* **1. Long range forecasting 2. 700 mb height anomalies.**—*I.L.D.*

9G–81 551.515.13:551.515.73

Klein, William H. (*Ext. Forecast Sec., U. S. W. B., Wash., D. C.*), **The frequency of cyclones and anticyclones in relation to the mean circulation. Journal of Meteorology,** 15(1): 98–102, Feb. 1958. 4 figs., table, 10 refs. **DWB.** Also issued as: Washington, D. C., U. S. Weather Bureau, 1956. 6 p. 6 figs. **DWB**—Punched card tabulations of location of centers of cyclones, anticyclones, cyclogenesis, anticyclogenesis and 700 mb zonal (West or East) wind speed, plotted on time-latitude charts for 0–90°N and Jan.–Dec. (taken from 1899–1938 N. Hemisphere Charts) show parallelism between center of zonal wind speed maximum and anticyclone activity throughout year (35° winter to 45 to 50° in summer), and a similar but not so good parallelism with cyclonic activity which lies 10 to 20° farther north; with anticyclogenesis and with cyclogenesis curve (whose maximum is south of jet stream maximum). Finally, annual mean frequency of each, by latitude, is shown on chart with greatest frequency that of cyclones at 52°N, anticyclones 35°N, cyclogenesis at 40°N. and anticyclogenesis 30–50°N. *Subject Headings:* **1. Cyclone frequencies 2. Anticyclone frequencies 3. Cyclogenesis 4. Anticyclogenesis.**—*M.R.*

9G–82 551.509.33

Klein, William H. (*Ext. Forecast Sec., U. S. W. B., Wash., D. C.*), **The Weather Bureau's 30 day outlooks.** *American Petroleum Institute, 36th Annual Meeting, Chicago, Nov. 1956, Proceedings*, Section 6/7:59–73, 1956. 12 figs., 2 refs. **DLC**—Also issued by U. S. Weather Bureau in mimeographed form, Wash., D. C., 1956. 12 p. numerous figs., refs. **DWB** (M09.33)—The methods used by the Weather Bureau's Extended Forecast Section in preparing 30-day outlooks are described and illustrated. *Subject Headings:* **1. Extended forecasting 2. U. S. Weather Bureau.**—*M.R.*

9G–83 551.509.53:551.524.32

Manohin, V., **Winterprognose 1954/55 auf Grund der Klimadaten von Ljubljana.** [Winter forecast for 1954/55 based on climatic data for Ljubljana.] *Wetter und Leben*, Vienna, 6(10/12): 222–224, 1954. **DWB.** Also his: **Winterprognose 1956/57 auf Grund der Klimadaten von Ljubljana.** [Winter forecast for 1956/57 on the basis of climatic data at Ljubljana.] *Ibid.*, 8(8/11):232–233, 1956. 2 tables. **DLC**—The forecast in the first paper is based upon the 49–50 year periodicity of cold winters, the 83–85 year rhythm of winter temperatures, the rhythm of temperature and precipitation in analogous climatic regions, and upon the relationship between the singularity of the first April pentad and the temperature conditions of the following winter. In the second paper, using the same 49–50 and 83–85 cycles described in earlier paper, the author determines analogs of monthly temperature for 1956–57 with the aid of smoothing, phase displacement and other techniques. Tables giving the deviations from the mean of the average monthly temperatures for 1957 and 1956, 1875 and 1956 and 1921–22, 1929–1930 and 1956–1957 are presented. On the basis of these data an early cold, even severe, 1956–57 winter is predicted and expected air temperature deviations from the mean are listed. *Subject Headings:* **1. Temperature rhythms 2. Winter weather forecasting 3. Temperature periodicities 4. Ljubljana, Yugoslavia.**—*I.L.D.*

9G–84 551.509.33:551.515.13

Marcus, Sidney Ottmar, Jr. (*Ext. Forecast Sec., U. S. W. B., Wash., D. C.*), **An empirical study of 5-day mean trough motion in the Eastern Hemisphere.** Wash., D. C., U. S. Weather Bureau, Sept. 1956. 7+p. 7 figs., 5 refs. photostat of typescript. **DWB**—A statistical study of Dec.–Feb. 5-day 700 mb charts from 1950–1954 confirm KLEIN's (1952) conclusion that troughs tend to accelerate when moving eastward toward a longitude of normal maximum frequency of troughs, and to decelerate or retrograde when moving away from an area of normal maximum frequency, and that they retrograde or die when moving eastward toward an area of normal minimum frequency and accelerate when moving away from areas of minimum frequency. *Subject Headings:* **1. Movement of troughs 2. Extended forecasting.**—*M.R.*

9G–85 551.509.3

*Massachusetts Institute of Technology, **(Daily and 5-day mean indices, Northern and Southern Hemispheres, 1951–1952, Supplement 1–2.)** Contract Cwb-8516, Extended Forecasting Project, Final Report, July 1, 1955–June 30, 1956. unpaged. entirely tables. carbon of typescript. **DWB** (M09.3 M414r 1955/56, Suppl. 1–2).—These extensive tables give circulation indices for 1951, including daily values of zonal indices (polar easterlies, zonal westerlies, subtropical easterlies), daily modified indices, daily meridional indices; zonal westerlies, meridional indices and modified zonal and meridional 500 mb indices; momentum transport indices and various other indices and pressure values for N. Hemisphere. Also, circulation indices for 1951–52 winter season based on revised seasonal trend corrections. (For earlier tables *see* 5.7–110, July 1954, *MAB.*) *Subject Headings:* **1. Circulation indexes 2. Northern Hemisphere.**—*M.R.*

9G–86 551.509.33:551.509.21

Mironovitch, Valéry, **Prévision du champ barométrique moyen en quinze et trente jours.** [Fifteen and thirty day forecasting of the mean barometric field.] *La Météorologie*, Paris, Ser. 4, No. 43:191–214, July/Sept. 1956. 14 figs., 3 tables, 13 refs., 6 eqs. French, English and Spanish summaries p. 191. **DWB**—A full exposition of a synoptic-statistical method of forecasting from 5, 15 and 30-day mean sea level isallobaric charts for the Northern Hemisphere (N. of 20°N). Using recent data, the irregular pattern of movement of the isallobaric centers is illustrated and the variability shown statistically for verification purposes. *Subject Headings:* **1. Long range forecasting 2. Extended forecasting 3. Isallobaric long range forecasting.**—*M.R.*

9G–87 551.509.33

*Nagao, T., **Characters of weather group and its application to long range weather forecasting, Pts. 10–15.** *Journal of Meteorological Research*, Tokyo, 8(4, 6, 8, 9, 10, 11):241–244, 383–387, 508–515, 593–599, 660–666, 731–734, 1956. figs., tables, eqs. All in Japanese. **DWB, DLC**—Relations between interdiurnal variability of temperature, monthly range of pressure, monthly mean temperature, etc. are analyzed from pressure and isothermal charts prepared for the U. S. **Pt. 15** contains a tabular presentation of temperature variability for Montgomery, Sapporo and Tokyo. (For more details, *see* abstracts on earlier reports in this series: 7.5–150, 9G–9 and 9G–59.) *Subject Headings:* **1. Interdiurnal temperature variations 2. Long range forecasting 3. United States.**—*G.T.*

9G–88 551.509.33:551.511

†Nagao, T. (*Training School for Met. Observer of C.M.O.*), **Turbulence theory of long range weather.** *Geophysical Magazine*, Tokyo, 27(2):301–342, March 1956. 28 figs., 39 refs., eqs. **DWB,**

DLC—The characteristics of long range weather are investigated and defined as the statistical property of successive weathers in a month and called a weather group for convenience of reference. To describe statistically the property of a weather group, statistical quantities such as dispersion (or standard deviation), autocorrelation coefficient and moment are necessary. In Ch. 1 the relation between the distribution of the above quantities and the monthly mean surface pressure pattern is discussed. In Ch. 2 and 3, the change of temperature and pressure as treated from the view-point of turbulence diffusion and as an index of turbulence intensity, are calculated for two kinds of mixing length. Comparing the distribution of mixing length thus calculated with the distribution of other elements such as monthly mean temperature or pressure, its standard deviation, its autocorrelation coefficient and others, it is found that at the region of small mixing length: 1. The gradient of monthly mean temperature or pressure is larger; 2. The standard deviation of monthly mean temperature or pressure is smaller; 3. The autocorrelation coefficient of monthly mean temperature or pressure is nearly zero; 4. The distribution of interdiurnal variability of temperature, autocorrelation coefficient or third moment of daily mean temperature has remarkable characteristics. In Ch. 4 the relation between the characteristics of cyclones and distribution of interdiurnal variability of temperature (or daily mean temperature), and the relation between the distribution of number (which is analogous to Prandtl number) and cyclone number passing the Japan area are discussed. *Subject Headings:* **1. Long range forecasting 2. Mixing length 3. Autocorrelations 4. Standard deviation of pressure 5. Turbulent diffusion.**—*Author's abstract.*

9G–89 551.513.2:551.509.33

Ozawa, T. and Tomatsu, K., **On the mechanism of warm and cold weather in summer in the neighborhood of Japan.** *Journal of Meteorological Research*, Tokyo, 8(8):495–502, Oct. **1956.** 9 figs., 4 tables, 20 refs. In Japanese; English summary p. 495. **DWB, DLC**—As a preparatory investigation for extended-period forecast of summer weather in the neighborhood of Japan, the authors have statistically studied the three-dimensional structure of the warm and cold weather in the above area. This analysis reveals the characteristics of the warm and cold periods, and then exposes the factor which plays a leading role in the mechanism. The results analyzed for Aug. of 1951 and 1952 show that the intensity and displacement of jet stream contribute much to the weather of Japan. And the transfer of angular momentum to the neighborhood of Japan and that to the area of Pacific Ocean were investigated. The meridional transfer of zonal angular momentum and the westerlies for the said areas are highly correlated. V. P. STARR's suggestion for the relationship between the tilt of trough and between the tendency of the zonal index change and the accumulation of angular momentum for the 5-day mean chart in the area of Pacific Ocean gives no better results than those obtained by W. G. LEIGHT. *Subject Headings:* **1. Extended forecasting 2. Summer weather 3. Jet stream effects 4. Zonal circulation 5. Japan.**—*Authors' abstract.*

9G–90 551.509.33:523.74

Willett, H. C. (*M.I.T.*), **Meteorological evidence for solar control of weather.** *Colorado. Univ. High Altitude Obs. Inst. for Solar-Terrestrial Research, Technical Report* No. 1, **1956.** Lecture No. 10 (7 p.) table, 6 refs. Also his: **Long range climatic forecasting on the basis of solar variability.** *Ibid.*, Lecture No. 21 (4 p.). **DWB** (M09.21 C719n)—In the first paper, several phenomena indicating climatic change as a function of sunspot activity are reviewed. In the second paper, a statistical-empirical method of forecasting is described and results obtained are discussed in some detail. It is shown that the forecasts and observed weather patterns agree reasonably well. Improved forecasts require closer work on the solar index and on the 11, 22 and 80-year sunspot cycles. *Subject Headings:* **1. Solar-weather relationships 2. Long range forecasting 3. Statistical forecasting 4. Sunspot cycles.**—*W.N.*

9G–91 551.509.33

Willett, Hurd C. (*Dept. of Met., Mass. Inst. of Tech., Cambridge*), **The outlook for long-range weather forecasting.** *New York Academy of Sciences, Transactions*, 18(4):359–366, Feb. **1956.** 6 refs. **DLC**—In this discussion of the prospects for successful long range forecasting, the author considers critically the purely statistical approaches and their limitations; the physical dynamic approaches including NAMIAS' monthly and seasonal forecasting techniques, SCHELL's dynamic persistence technique, STAN's study of the dynamics and thermodynamics of the general circulation, and WILLETT's study of the mechanism of the general circulation by index correlation; and approaches that involve irregular solar activity including the statistical synoptic analysis of long-term (climatic) solar-weather relationships, the use of solar analogs for monthly or seasonal forecasting and the short term reactions of the general circulation to sudden solar impulses. *Subject Headings:* **1. Solar-atmospheric relationships 2. Long range forecasting 3. Statistical forecasting.**—*I.L.D.*

1957

9G–92 551.509.5

American Meteorological Society (Council), **Statement on weather forecasting.** *American Meteorological Society, Bulletin*, 38(7): 406, Sept. **1957.** Also in: *Weatherwise*, Boston, 10(4):cover, No. 2, Aug. **1957. DWB**—Weather forecasts can be made in some detail and with considerable reliability for 1, 2 or even 3 days, but the accuracy decreases progressively after the first day. Three to 7 day forecasts must be couched in less specific terms (i.e., above or below normal temperature or precipitation). Day-by-day forecasts cannot be made for periods beyond 1 week in advance. The success of seasonal (>1 month) forecasts has not yet been demonstrated and are apt to be misleading, especially if made on a day-by-day basis. *Subject Headings:* **1. Extended forecasting 2. Seasonal forecasting 3. Forecast accuracy.**—*M.R.*

9G–93 551.509.318:551.509.33

Asakura, T., **The relationship of 5-day mean 700-mb chart to 5-day mean surface temperature anomaly.** *Journal of Meteorological Research*, Tokyo, 9(5):344–348, July **1957.** 2 figs., 3 tables, 4 refs., 4 eqs. In Japanese; English summary p. 344. **DWB, DLC**—Some relations between 5-day mean flow patterns and the anomaly of 5-day mean surface temperature have been clarified from the statistical and dynamical points of view and they may be summarized as follows: (1) Types of upper mean chart have their own peculiar distribution of surface temperature anomaly. *Z*- and *S*-type are in general associated with the above normal surface temperature while *B*-type with below normal surface temperature; (2) Distribution of the anomaly of surface temperature referred to the upper mean trough is shown in Fig. 1 and this shows clearly that cold weather prevails in the trough zone and warm weather dominates about 1500 km down stream of the mean trough; (3) Regional zonal index has not always the same relation to the surface temperature anomaly but low index flow pattern aloft has many chances to bring cold air invasion, while, in case of high index pattern, definite relation has not been found. These results hold well in winter and summer, but in spring and autumn poor relations between them are found; (4) A method of numerical estimation of surface temperature anomaly using the upper mean chart is proposed. Under the assumption of conservation of the thickness (700∼1000 mb), the trajectory of air parcel has been traced considering the turbulent structure of the atmosphere. *Subject Headings:* **1. 5-day anomaly types 2. Extended forecasting 3. Temperature anomalies 4. Japan.**—*Author's abstract.*

9G–94 551.509.33

Bagrov, N. A., **Dolgosrochnye prognozy pogody za rubezhom.** [Long range forecasts in foreign countries.] *Meteorologiia i Gidrologiia*, Leningrad, No. 5:57–62, May **1957.** 19 refs. **DWB**—In this review of research on long range forecasting outside the U.S.S.R., the author discusses in particular the work of J. NAMIAS in the U. S. and of FRANZ BAUR in Germany. The theoretical basis of long range forecasting underlying the work of NAMIAS and BAUR and the procedures for making long range forecasts are described in detail. Also discussion on the possibility of long range forecasting on the application of dynamic and statistical methods to this end associated with the work of WILLETT, SUTCLIFFE, SUTTON, WADSWORTH, etc., are summarized. *Subject Headings:* **1. Long range forecasting 2. United States 3. Germany.**—*I.L.D.*

9G–95 551.509.53:551.590.21

Dinies, E., **Ein Beitrag zur Vorhersage der Temperatur des Hochwinters auf Grund der Sonnenfleckentätigkeit in den Vormonaten.** [Forecasting the temperature of mid-winter by the sunspot activity of the preceding months.] *Meteorologische Rundschau*, 10(2):45–47, March/April **1957.** 2 tables, 2 refs. **DWB.** Review by Heinrich Faust in *Naturwissenschaftliche Rundschau*, 11(1): 25–26, Jan, **1958**—A rise of 3-month means of sunspot numbers July–Nov. and a fall in Jan.–July are nearly always followed by a positive temperature departure in Jan. and Feb. in Europe (mean of Utrecht, Berlin and Vienna). This is attributed to increased UV radiation from faculae. This warms the ozonosphere especially in low latitudes and raises pressure there. The resulting increased W-E circulation persists into Jan.–Feb. The influence of the change from Jan. to July is more difficult to explain. *Subject Headings:* **1. Temperature forecasting 2. Seasonal forecasting 3. Sunspot effects on temperature.**—*C.E.P.B.*

9G–96 551.509.33:551.577.32:551.582

Fukuhara, K., **Climatological study on the Bai-u, Pt. 1.** *Journal of Meteorological Research*, Tokyo, 8(12):745–750, Jan. **1957.** 8 figs., 3 tables, 11 refs. In Japanese, English summary p. 745. **DWB, DLC.** Also: Neyama, Y. **(Comments on above article) (and) reply by Fukuhara.** *Ibid.*, 9(6):452–454, July **1957.** 2 figs. **DWB**—The Bai-u is a season during which copious rains fall in western Japan and in parts of China. In this report the author examined a method of determining the time of beginning or ending of Bai-u in western Japan, using the discontinuous process of meteorological elements, especially of daily air temperature and of daily vapor tension. And then, the

change is examined in the light of large scale phenomena, such as blocking, zonal index and long wave. *Subject Headings:* **1. Bai-u rainfall forecasting 2. Climatic studies 3. Western Japan 4. China**—*Author's abstract.*

9G–97 551.509.5

Klein, William H. (*Ext. Forecast Sec., U. S. W. B., Wash., D. C.*), **An objective method for predicting 5-day mean temperature. Paper presented at 155th National Meeting of A.M.S., April 30, 1957,** Wash., D. C. 8 p. 10 figs. **DWB** (M09.53 U587om)—Based on developmental sample of 44, 5-day mean periods, a week apart during 10 Januaries from 1946–1955, using 5-day mean temperature at 23 cities in the U. S. and 5 parameters (anomalies) observed 4 days previously. These parameters were: 1) surface temperature at the same 23 cities (autocorrelation of 77), 2) 700 mb height and 3) temperature, 4) sea level pressure, and 5) 700–1000 mb thickness. Thousands of correlations were computed, using the IBM 701. Jan. temperature at Bismarck was best correlated with 700 mb height 4 days earlier at a point on the Alaska Penninsula (−0.67). At 4 cities the 700 mb height proved best forecast parameter. Other parameters are discussed and illustrated on maps of U. S. for Albany, Cleveland, Bismarck, Sacramento and Chicago. *Subject Headings:* **1. Objective temperature forecasting 2. Extended temperature forecasting 3. United States.**—*M.R.*

9G–98 551.509.33:518.5 551.509.617:518.5

Krick, I. P., **The use of high-speed electronic computers for long-range weather forecasting and cloud-seeding evaluation.** (In: U. S. Congress. Senate. Committee on Interstate and Foreign Commerce, **Hearings before a Subcommittee . . . 85th Congress, 1st Session on S.86 a Bill to provide for an experimental research program in cloud modification. March 26 and May 13, 1957.** p. 66–70.) **DWB** (M09.67 U581ex)—The long range forecasting method developed in the 1930's at California Institute of Technology is briefly explained. It is based on the discovery of 6-day sequential patterns of pressure wave systems and their associated weather. The method has been adapted to a machine technique, and 20 years of data are now on cards which are being processed with the Remington Rand Univac computer. It is claimed that day-by-day forecasts for periods several times the length of the data record can be produced. By preparing seasonal forecasts of precipitation in seeded and control areas, more refined evaluation of weather modification operations becomes possible. *Subject Headings:* **1. Numerical long range forecasting 2. Cloud seeding evaluation.**—*G.T.*

9G–99 551.509.312:551.509.33

Lecce, B. and Del Trono, F., **Previsione a lunga scadenza mediante le singolarità di pressione e comportamento dell'onda portante a 500 mb.** [Long range forecasting by means of pressure singularities and the behavior of the carrier wave at 500 mb.] *Rivista di Meteorologia Aeronautica*, Rome, 17(2):3–19, April/June **1957.** 6 figs. French, English and German summaries p. 3. **DLC**—After stressing the importance of pressure singularities for long and medium range forecasts, according to GRAPPE's conception, the writer proceeds to examine the behavior at 500 mb of these singularities and of the carrier wave. The latter is found to be sinusoidal and to undergo contractions and expansions in connection with deviations from singularities. Two exemplifying diagrams which show date and amplitude deviations of a single (surface) singularity for a period of 35 yrs indicate a periodicity, thus allowing hope that it will be possible to make even very long range general forecasts, if an appropriate evaluation scale is adopted. Possible relations with astronomical periodicities are suggested. *Subject Headings:* **1. Long range forecasting 2. Pressure singularities.**—*Authors' abstract.*

9G–100 551.509.33

McIntosh, D. H., **Long-range weather forecasting.** *Weather*, London, 12(2):37–45, Feb. **1957.** 15 refs. **DWB.** Also extensive summary of the preceding article: Bellisario, A.: **A che punto siamo con le previsioni a lunga scadenza?** [Where are we with long range forecasting?] *Rivista di Meteorologia Aeronautica*, Rome, 18(1):44–47, Jan./March **1958. DLC**—A general review. Statistical methods—Periodicities and pressure waves, solar connections, lag correlations (WALKER), regional weather spells, contingencies, singularities, symmetry points—seem unlikely to succeed. Synoptic methods—weather types, analogs, etc.—run into difficulties as forecast period lengthens. Numerical methods may ultimately have advantages. *Subject Heading:* **1. Long range forecasting.**—*C.E.P.B.*

9G–101 551.509.33

†Matsukura, H., **Application of the variation of latitude to long-range weather forecasting.** *Journal of Meteorological Research*, Tokyo, 9(4):229–246, June **1957.** 23 figs., 5 tables, 26 refs. In Japanese; English summary, p. 229. **Comments** by T. Sugawa and **Reply** by Matsukura. *Ibid.*, 9(11):850–851, Nov. **1957. DWB, DLC**—The author has investigated the relation between the

limate of the Tohoku District in Japan and the variation of the rotational axis of the earth, after R. SPITALER's research (1930) in which it is shown that the transport of air mass on the earth is proportional to the change of centrifugal force due to the variation of the axis of the earth. The ummary results in this paper are as follows: 1) Approaching of the North Pole toward Japan from he mean position often brought cold weather over the Tohoku District and often left warm weather n the period 1890–1955, 2) The 30-year period of summer temperature over the Tohoku District eems to be connected with the variation of latitude. *Subject Headings:* **1. Long range forecasting 2. Latitude shifting 3. Tohoku District, Japan.**—*Author's abstract.*

9G–102 551.509.33:551.509.312

Namias, Jerome (*Chief, Ext. Forecast Sec., U. S. Weather Bureau*), **Weather forecasting in ransition: a survey and outlook.** *Weatherwise*, Boston, 10(4):119–120 and 140–142, Aug. **1957.** DWB—Weather forecasting is in a state of transition from "subjectivity to objectivity" or from "art to automation." Numerical forecasting results from the amount of data in 3 dimensions, better physical knowledge of the atmosphere and the availability of the electronic calculators. The greatest improvement through use of numerical methods has been in 48-hour barotropic forecasts. 24-hour forecasts are no better than subjective and 72-hour forecasts deteriorated too badly. More elements can be predicted for a wider area by using objective methods in extended o: 30-day prediction. Examples are given. The future looks favorable. *Subject Headings:* **1. Numerical forecasting evaluation 2. Numerical long range forecasting techniques 3. Extended forecasting.**—*M.R.*

9G–103 551.509

†Petterssen, Sverre (*Chicago Univ.*), **Weather observations, analysis and forecasting.** *Meteorological Monographs* (American Meteorological Society), Boston, 3(12–20):114–151, July **1957.** 5 figs., 15 tables, bibliog. p. 148–151, 72 eqs. **DWB, DLC**—A comprehensive review of recent progress (1951–1955) in weather analysis and forecasting. The scope of this review is indicated by the following outline made by the author: approach to the forecasting problem (hydrodynamic and statistical approaches), types and analogs, parameter techniques, computation and extrapolation; development of cyclones and anticyclones (distribution of divergence along the vertical dynamics of development, assessment of development); numerical integration (RICHARDSON'S computations, Charney's filter, quasi-geostrophic equation; the barotropic model, multi-level models, and the results of forecasts with their models; forecasts of precipitation, the geostrophic approximation); graphical integration (Fjørtoft's method), advecting the vorticity, recovering the height changes, critical comments on barotropic integration, extension of Fjørtoft's approach to baroclinic models, forecasts of precipitation associated with cyclones using the prediction equations developed for baroclinic models, computation and extrapolation (formulas, verifications); forecasting by time series analysis (the circulation pattern, the prediction model and examples of application); mixed procedures (parameter techniques, severe local weather warnings, tropical weather, RIEHL'S trends, long range forecasting); analysis and observations (the synoptic language, moisture analysis, ali purpose and special analyses; predictability and suggestions for research. *Subject Headings:* **1. Weather analysis 2. Forecasting techniques 3. Progress in weather forecasting.**—*I.L.D.*

9G–104 551.509.33:519.2

Sawada, T. (*Hakodate Marine Obs.*), **A study on the statistic forecast of summer temperature over the Northern Japan using the amount of sea-ice over Okhotsk Sea, Pt. 1.** *Meteorological Society of Japan, Tokyo, Journal*, Ser. 2, 35(1):60–66, Feb. **1957.** 2 figs., 5 tables. **DWB, DLC**—It has been indicated that the occurrence of cold or hot summer over northern Japan is closely connected with the intensity of the oceanic circulations in Tohoku sea region (Oyashio). On the other hand, it is also a well-known fact that the intensity of Oyashio is reenforced by sea ice in the Okhotsk Sea. The author analyzed the drift-ice periods at Abashiri and Shana by using an index of the sea-ice intensity in the Okhotsk Sea, and the annual deviations in drift-ice periods at both places are divided into five types for the sake of convenience. From the significance test of differences between sample and population probability on each type, it appears that cold summers are apt to occur after SO-type or L_2-types in the same year (level of significance 25%). *Subject Headings:* **1. Statistical forecasting 2. Seasonal forecasting.**—*Author's abstract.*

1958

(*See also* 9G–81)

9G–105 551.509.33:519.24

†Kelley, Elizabeth A., **Extended-range forecasting by a statistical procedure.** Massachusetts Institute of Technology. Dept. of Meteorology, Contract AF 19(604)-1566, Scientific Report No. 5, March **1958.** 55 p. 45 tables, 12 refs., eqs. **DWB**—Methods utilizing orthogonal functions are

available for reducing the number of original predictors in statistical prediction equations. Two these methods utilize Chebyshev's orthogonal polynomials ("Z's") and Empirical Orthogonal Fun tions ("Q's"). These two methods are used in combination to develop a statistical predicti equation for surface 5-day-mean temperature anomalies for five North American stations for t winter months of Dec., Jan. and Feb. The original predictors used are the 700 mb 5-day-me height anomalies and the 700 mb 5-day-mean temperatures over a 95 point grid. The "Z's" redu the 190 predictors to 56 predictors, while the "Q's" reduce the 56 "Z" predictors to 20 "Q" pr dictors. Prediction equations are developed for half-week forecasts and full-week forecasts. R ductions of error with respect to climatology are computed. Skill is positive for all stations for t half-week forecasts, but drops off quite rapidly for the full week forecasts with negative skill at o station. The predicted temperature anomalies are placed in U. S. Weather Bureau categories an verified. The results of this verification are more promising, as the range of the category absor much of the error. Some considerations for further development of statistical prediction for e tended range forecasts are discussed. *Subject Headings:* **1. Statistical forecasting 2. Extended for casting.**—*From author's abstract.*

9G–106 551.509.33:551.513.1:551.590.2

*Massachusetts Institute of Technology, **Extended forecasting project. Progress Repor July 1–Dec. 31, 1954,** issued Jan. 1, **1955.** 20 p. 4 tables (fold.). Also: **Progress Report, July 1 Dec. 31, 1955,** issued Jan. 1, **1956.** 16 p. Also: **Final Report for the fiscal year July 1, 1955 June 30, 1956,** issued July 1, **1956.** 17 p. Also: **Progress Report, July 1–Dec. 31, 1956,** issue Jan. 1, **1957.** 10 p. 4 tables. Also: **Final Report for the fiscal year July 1, 1956–June 30, 195** issued July 1, **1957.** 15 p. Also: **Progress Report, July 1–Dec. 31, 1957,** issued Jan. **1958.** 13 All typescript. **DWB** (M09.3 M414r)—Progress in various phases of the Project is reporte namely a) analysis of Northern Hemisphere Synoptic Data (including use of IBM punch card such as 5-day mean maps, profiles, circulation indices, correlation coefficients; b) study of sol weather relationships; c) statistical 30-day prediction by empirical orthogonal functions (Do GILMAN in 1956/57 Final Report); d) operational monthly and seasonal forecasting, etc. (For oth reports on this Project, *see* 5.7–110, 5.9–82, 6.5–117 and 6.8–109, 1954 and 1955, *MAB.*) *Subje Headings:* **1. Extended forecasting 2. Northern Hemisphere circulation 3. Punched card analysi 4. Empirical orthogonal functions 4. Solar weather relationships. I. Willett, H. C. II. Gilman, Do III. Contract Cwb-8516 IV. Contract Cwb-8609 V. Contract Cwb-9232.**—*G.T.*

9G–107 551.509(05

Moscow, Tsentral'nyĭ Institut Prognozov, **Trudy,** Vol. 1, **1947.** Latest issue seen, No. (i.e Vol.) 63, **1957.** irregular. Vol. 1 also called Vol. 28, continuing the numbering of the Trud Nauchno-Issledovatel'skikh Uchrezhdeniĭ of the U.S.S.R. Glavnoe Upravlenie Gidrometeorolog cheskoĭ Sluzhby. Double numbering ceased with No. 50, 1957. **DLC**—The Tsentral'nyĭ Institu Prognozov was established in 1936 (from 1936 to 1943 it was called Tsentral'nyĭ Institut Pogody Its objective in the field of scientific research is to develop methods of long and short range weath forecasting, hydrological, marine meteorological, agrometeorological and fire weather forecastin Results of research in these areas are reported in the Institute's *Trudy,* a series of collections articles (containing up to a dozen or more papers per issue) published at irregular intervals (mo than a dozen issues were published in 1957), ranging in size from around a hundred to close to tw hundred pages. Most of the papers deal directly with forecasting methods, many of them in t field of extended and long range forecasting. For a listing of contents of several numbers of t *Trudy* see Pt. 3 of this issue. All articles are being abstracted separately. *Subject Headings:* **1. M teorological periodicals 2. Soviet forecasting service 3. Weather forecasting 4. U.S.S.R I. U.S.S.R. Glavnoe Upravlenie Gidrometeorologicheskoĭ Sluzhby.**—*G.T.*

SUPPLEMENTARY MATERIAL

9G–108 551.524.33:551.509.33:519.

Fukuda, Kiyoshi, **Forecasting of time series by moving average.** *Journal of Meteorologic Research,* Tokyo, 6(10/11):516–526, Dec. **1954.** 5 figs., 2 tables, 8 refs., 10 eqs. In Japanes English summary p. 516. **DWB.** Also in: *Sendai, Japan. Central Meteorological Observato Bulletin of the Meteorological Society for Research of Tohoku District,* 8(2):516–526, Jan. **1955.** 5 fig table, 8 refs. In Japanese; English summary p. 516. **DWB**—In this paper the author presented improved method of weighted moving average, which is available for the forecasting of quasi-perio icities of meteorological elements. The method is as follows. Put $Pn = \sum_i ai \cos\left(\frac{2\pi}{Ti} n + \delta i\right)$, whe Pn is the value of variable at time n and is a periodic function, then $P_{n-1} + \alpha Pn + P_{n+1} = \sum_i$

$\left(2\cos\frac{2\pi}{Ti}+\alpha\right)\cos\left(\frac{2\pi}{Ti}n+\delta i\right)$, assuming $\alpha=-2\cos\frac{2\pi}{Ti}$. Thus the oscillation with period Ti van-

nes and the amplitude of the period Tj increases the value by $2\left(\cos\frac{2\pi}{Tj}-\cos\frac{2\pi}{Ti}\right)aj$. By repeating

e above smoothing procedure many times, any particular period can be detected. In this paper e monthly mean temperature march at Miyako was examined as an example. From this analysis, was noticed that 2-, 4- and about 7-year period predominate in the secular change of temperature each month from Jan. to Dec. In addition to these periods the temperature trend with 30-year riod predominates in July, Aug. and Sept., and in Feb. only 17-year period predominates. *Subject eadings:* **1. Temperature variations 2. Temperature periodicities 3. Long range temperature recasting 4. Time sferics.**—*Author's abstract.*

9G–109 **551.509.33**

*Gilman, Donald L., **Empirical orthogonal functions applied to thirty-day forecasting.** Massausetts Institute of Technology. Dept. of Meteorology, Contract AF 19(604)-1283, Scientific eport, No. 1, June 30, **1957.** 129 p. 32 figs., 21 tables, 17 refs., 60 eqs. **DWB**—The Empirical rthogonal Function technique is here brought to bear on the problem of thirty-day forecasting. rom the winter months of the 40 years 1899–1939, functions are established for thirty-day mean ressure anomalies over the Northern Hemisphere and also for thirty-day mean temperature anomies over the U. S. The pressure functions are correlated with the temperature functions, first ntemporarily (specification), then at one month lag (prediction). The linear regression equations or specifying and predicting the temperature field) based on these correlations are tested on an dependent sample of 27 postwar winter months. The resulting reductions of error are compared ith those generated by climatology, persistence, and chance, and also with expected values based n reductions of variance obtained within the original sample. It is found that the prediction scores, though small, are positive with respect to all three of the above verification standards. The nalysis is then extended to include the geographical distribution of specification and prediction cores. Finally, a brief discussion is given concerning the physical nature of the long-range forecastng problem, and suggestions are made for further statistical work on that problem. *Subject Headngs:* **1. Long range forecasting 2. Empirical orthogonal functions.**—*From author's abstract.*

9G–110 **551.509.33**

Hess, P. and Hofmann, A. (*both Frankfurt/M.*), **Medium-range forecasting techniques for entral Europe, Pt. 1.** Germany. Deutscher Wetterdienst, Contract AF 61(514)-646-C, Final eport, June **1956.** 42 p. 23 figs., 9 tables, 3 refs., eqs. Also **Pt. 2** by A. Hofmann et al., Contract F 61(514)-954, Final Report Sept. **1957.** 42 p. 12 figs., 8 tables, 15 refs.—In the first part of the udy a statistical method is described (multiple correlation table), whereby 24, 48, 72 and 96-hr hanges of surface and 500 mb pressure are predicted daily for 15 grid points in Europe. The ten redictors used are discussed in detail. Both punch-card and manual sorting have been tried and he latter proved much faster. The forecast procedure is described and an example of its application s given. In addition to the statistical method the second paper deals with a method of isopleth xtrapolation and with its combination with the statistical method. Further a method of "sliding orecasts" (with a longer forecast period than the extended forecasts) is described and its application o the winter 1956/57 is demonstrated. An accuracy of 78% is obtained by this method for Central urope for forecast periods of an average 10-day duration. The method involves combined use of tatistical parameters, periodicities and other forecasting indices. *Subject Headings:* **1. Extended orecasting 2. Statistical forecasting 3. Forecast verification 4. Central Europe. I. Diehl, H. I. Dinies, E. III. Seidel, G. IV. Trenkle, H.**—*G.T.*

9G–111 **551.509.33**

Jansá Guardiola, José Maria, **El método de amortiguación aplicado a la meteorología.** [Method f amortization applied to meteorology.] *Spain. Consejo Superior de Investigaciones Científicas. nstituto Nacional de Geofísica, Publications*, No. 17, **1950.** 103 p. 23 figs., 4 graphs, 3 tables, 3 eqs. **DWB** (M:311.2 J35me)—A monograph consisting of a long theoretical development of the lea of forecasting by "amortizing" the meteorological or climatological variables mathematically r statistically. The theory is based on the philosophical argument that all current or future weather tuations are a consequence of all past physical factors. Chapters are devoted to the theory, the lgebra of amortization; the idea applied to the geostrophic winds, cyclostrophic winds, frontogenesis, eneral circulation, cyclones and anticyclones; techniques of forecasting, examples (June 30, 1932 t 07 h, Jan. 23–Feb. 4, 1932; etc.); some new applications and tables for computing various paameters given certain pressures (980–1050 mb.) up to 43 days. Examples of climatological values r Palma de Majorca for 1940 are presented graphically. *Subject Headings:* **1. Long-range forecastg 2. Amortization method 3. Palma de Majorca, Spain.**—*M.R.*

9G–112 551.509.3

Jílek, Josef, **Rytmus a dlouhodoba prognosa.** [Rhythm and long range forecasting.] *Meteorologické Zpravy*, Prague, 7(3):71–, June **1954.** 7 figs. Trans. into English available for reference. **DWB** (M09.22 J61rh)—The article evaluates the usefulness of the three-month rhythm of the Multanovskiĭ school for weather forecasting in Central Europe. *Subject Headings:* **1. Long range forecasting 2. Periodicities.**—*Author's abstract.*

9G–113 551.509.3

Khrabrov, Iu. B., **O sostavlenii mesiachnykh prognozov pogody s umen'shennoĭ zablagovremennost'iu.** [The compilation of monthly weather forecasts with reduced preparation time.] *Meteorologiia i Gidrologiia*, No. 10:30–33, Oct. **1956.** 7 refs. **DWB, DLC**—In the preparation of long range forecasts by the Central Institute of Forecasting, one of the principle obstacles in using various forecasting inferences was the extreme earliness in the final selection of the annual analog for making the monthly forecast. The preparation of long range forecasts (which began 40 days before the actual effectiveness of the forecast itself) up to 1956 is described. The new procedure for preparing such forecasts and their statistical verification is based upon the following variations in synoptic processes: (a) the nature of the synoptic processes according to the tendency of the synoptic season and the character of the crises process as propounded by B. P. Multanovskiĭ and others; (b) the nature of the mid-seasonal air temperature anomaly of the approaching season (E. I. Borisov, et al.); the preparation of long range forecasts for the individual months by the new methods which shortens the period of preparation is described. *Subject Headings:* **1. Long range forecasting 2. Forecasting techniques 3. Forecast verification.**—*I.L.D.*

9G–114 551.509.3

Spar, Jerome (*New York Univ. Dept. of Met. and Oceanog.*), **The outlook for long-range weather forecasting and climatology.** *National Conference on Applied Meteorology, Hartford, Conn., Oct.* 1957. Section D:14–19. **DWB** (M A512pro)—General ideas upon which various approaches to long range forecasting are based, and seven procedures for making long range forecasts are described. The procedures are the synoptic, direct statistical, direct solar, physical-parameter, indirect solar, synoptic-statistical and numerical methods. Climatological forecasting is mentioned as a gap filling substitute. *Subject Heading:* **1. Long range forecasting.**—*G.T.*

9G–115 551.509.3

Stuchlík, František, **Dlouhodobá předpověď—její účel a řešení.** [Long-range forecasting—its end and means.] *Meteorologické Zpravy*, Prague, 7(4):111–112, **1954.** 8 refs. English trans. available. **DWB** (M09.33 S932Lo)—The use of periodicities, correlations, trends, singularities and analogies in long-range forecasting is discussed in general terms. The importance of studying solar effects upon the atmosphere is stressed. *Subject Heading:* **1. Long range forecasting.**—*G.T.*

9G–116 551.509.33:551.524.3

Sweeney, W. J. (*Esso Res. and Eng. Co., N. Y.*), **Importance and need of degree-day forecasting for the petroleum industry.** *Weatherwise*, Boston, 10(6):197–201, 214, Dec. **1957.** 4 figs., 2 tables. Also as: *American Petroleum Institute, 36th Annual Meeting, Chic., Nov. 1956, Proceedings*, Section 6/7:46–50, **1956.** Also as: *National Conference on Applied Meteorology, Hartford, Conn., Oct. 1957 Proceedings*, issued **1957.** Section B:1–7. **DWB**—If better seasonal (3-month) temperature or degree-day forecasts could be obtained the U. S. petroleum industry would save an estimated $10 million a year in storage and production costs alone, without considering savings in marine, pipeline or distribution costs. In a warm winter demands may be 28% less than in a cold winter, as shown by annual degree day graph for N. Y. City (1870–1956) which is similar to that for the Northern U. S. Good forecasts could allow lower inventories to be maintained at beginning of heating season and smoother production year. Estimated cost of weather research is .2 of 1% of that in petroleum refining research. *Subject Headings:* **1. Seasonal degree-day forecasts 2. Degree-day forecasts 3. Long range temperature forecasts 4. Weather and petroleum industry.**—*M.R.*

9G–117 551.509.3

Willett, Hurd C., **Prospects for reliability in long-range forecasting.** *American Petroleum Institute, 36th Annual Meeting, Chicago, Nov. 1956, Proceedings*, Section 6/7:82–86, **1956. DLC**
The author presents the prospects for improvement of long-range forecasts during the next decade as being very rosy—i.e., an increase in "skill score" from a present 20% (upper limit) to 50–60% and eventually, with improved knowledge coming from study of solar activity and its effect on world weather patterns, to 70% or even better!! By long-range, the author means monthly or seasonal forecasts of departures from normal temperature or rainfall averages over state-wide areas. Three approaches to research which will lead to improvements are listed and discussed: 1) meteorological statistical; 2) physical-synoptic; and 3) solar variability. The statistical approach is favored by the

ost complete data resources but is self-limiting and will be exhausted in 3 to 6 years. The synoptic proach will not reach its optimum until solar effects are understood. *Subject Headings:* **1. Long nge forecast improvement 2. Solar-weather relationships.**—*M.R.*

9G–118 551.509.33:523.74

†*Willett, Hurd C., **Statistical application of atmospheric circulation and solar indices to extended id long-range forecasting.** Massachusetts Institute of Technology. Dept. of Meteorology, ontract AF 19(604)-1283, Final Report, Oct. 31, **1957.** 27 p. 4 tables (fold.), 23 refs. **DWB** M09.33 M414sc)—The primary objective of this project was to continue and to expand applied search in extended and long-range forecasting that was initiated under Contract No. AF 19(604)-9. The project planning of research was adapted for greatest efficiency, to anticipated long-term eration of this project. Consequently the sudden and unexpected termination of the contract the conclusion of the current contract year leaves a number of investigations in comparatively ncompleted form with comparatively little to report in the nature of final results or conclusions, nce the briefness of this Final Report. As initially planned, the work in this project was centered a three interrelated primary investigations. Subsequent developments dictated temporary post-nement of work on two of these, in favor of a fourth investigation, essentially statistical in nature, hich during the past two years has represented two thirds of the total project effort. These four vestigations, and their principal results, may be summarized as follows: 1) operational monthly id seasonal forecasting of temperature and precipitation over the continental United States; the interpretation of the internal mechanics of the general circulation by the correlation of selected dex parameters; 3) the study of the solar influence in the control of the general circulation; and the application of empirical orthogonal functions to thirty-day forecasting. *Subject Headings:* **Extended forecasting 2. Long range forecasting 3. Statistical forecasting 4. Solar weather**

9G–119 551.509.33:016

†Meteorological Society of Japan, [**Bibliography of seasonal weather forecasting.**] Kisetsu yoho unken mokuroku. Tokyo, **1956.** Each section repaged. [248 p.] **DWB** (M(016) M589bi)—bout 1300 papers from 26 American and European, 16 Japanese and several other journals are mpiled with annotations in Japanese. The period covered is 1735–1956. The entries are in the nguage of the original item. The work was done by the staff of the Meteorological Research stitute. About one third of the literature included is from Japanese sources. The bibliography divided into 14 sections as follows: 1) General reports (77 items), 2) Theory of atmospheric circula-on (134), 3) Synoptic analysis of atmospheric circulation (155), 4) Air masses (66), 5) Abnormal eather (85), 6) Secular variations (74), 7) Periodicities (157), 8) Correlations (123), 9) Singularities 2), Ocean (96), 11) Celestial effects on weather (23), 12) Solar activity (128), 13) Effects of air llution (33) and 14) Methods of forecasting (111). *Subject Headings:* **1. Seasonal forecasting bliographies 2. Singularities 3. Periodicities 4. Correlations.**—*Jay Woo.*

PART III. REVIEWS, TRANSLATIONS, RECENT MONOGRAPHS AND ANALYTICS FROM SERIALS AND COLLECTED WORKS

Note: Material listed in these sections will not be included in the monthly indexes until abstracted. The item number is mentioned for those titles which have been abstracted in previous issues of **Meteorological Abstracts and Bibliography.**

A. REVIEWS OF IMPORTANT METEOROLOGICAL MATERIA

Advances in Geophysics, Vol. 3, ed. by H. E. Landsberg. N. Y., Academic Press, 1955. 286 Numerous figs. (incl. photos), bibliog. at end of each section. Review by R. S. Scorer in *Scien Progress*, London, 44(174):320–322, April 1956. Review by F. Steinhauser in *Archiv f Meteorologie, Geophysik und Bioklimatologie, Ser. A*, Vienna, 10(2/3):271–274, 1958. (*F abstract on the original, see* 8.8–1, Aug. 1957, *MAB*)

Berliand, M. E.: **Predskazanie i regulirovanie teplovogo rezhima prizemnogo sloia atmosfery** [Pr diction and regulation of the thermal regime of the atmospheric layer near the ground]. Leni grad, Gidrometizdat, 1956. 434 p. 94 figs., 24 tables, 525 refs., eqs. Review by P. Tverskoĭ in *Meteorologiia i Gidrologiia*, Leningrad, No. 11:51–52, Nov. 1956. (*See* 8.8– Aug. 1957, *MAB*)

Cavallaro, C. and Gandolfo, S.: **La pioggia a Lipari dal 1919–1954** [Precipitation at Lipari, 191 1954]. And: **La pioggia a Stromboli 1924–1942 e dal 1948–1954.** *Società Peloritana di Scien Fisiche, Matematiche e Naturali, Messina, Atti*, 1955/1956, p. 93–102 and 151–161. Review *Società Geografica Italiana, Bollettino*, Ser. 8, 9(9/10):491, Sept./Oct. 1956.

Dietrich, Günter and Kalle, Kurt: **Allgemeine Meerskunde: eine Einführung in die Ozeanograph** [General oceanography: an introduction]. Berlin, Borntraeger, 1957. 492 p. 223 fig 30 plates, 63 tables, bibliog., p. 458–471, eqs. Review by F. Steinhauser in *Archiv f. Me Geophysik und Bioklimatologie, Ser. A*, 10(2/3):276–278, 1958. (*See* 8.6–7, June 1957, *MA*

Dietze, Gerhard: **Einführung in die Optik der Atmosphäre** [Introduction to atmospheric optics Leipzig, Geest & Portig, 1957. 263 p. Numerous figs., tables and eqs. Bibliog. p. 253–2 Review by F. Lauscher in *Wetter und Leben*, 9(6/9):127–128, 1957.

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PERIODICALS IN WHICH METEOROLOGICAL ARTICLES REGULARLY APPEAR

★**Acta Geophysica Polonica,** [Warsaw].
Akademiia Nauk SSSR, Izvestiia, Ser. Geogr. and **Ser. Geofiz.,** [Moscow].
American Geophysical Union, Transactions, [Washington].
★**American Meteorological Society, Bulletin,** [Boston].
★**Angewandte Meteorologie,** [Potsdam].
Annales de Géophysique, Centre National de la Recherche Scientifique, [Paris].
★**Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A and Ser. B,** [Vienna].
Australian Journal of Physics, [Melbourne].
★**Australian Meteorological Magazine,** [Melbourne].
★**Ciel et Terre,** Société Belge d'Astronomie, Météorologie et Physique du Globe, [Brussels].
★**Geofisica e Meteorologia,** Società Italiana di Geofisica, [Genoa].
Geofisica Pura e Applicata, Istituto Geofisico Italiano, [Milan].
★**Geophysical Magazine,** Japan Meteorological Agency, [Tokyo].
Hemel en Dampkring, [The Hague].
★**Időjárás,** Magyar Meteorólogiai Társaság and Országos Meteorológiai Intézet, [Budapest].
★**Indian Journal of Meteorology and Geophysics,** [Delhi].
★**Journal of Atmospheric and Terrestrial Physics,** [London].
Journal of Geophysical Research, [Washington]
★**Journal of Meteorological Research,** [Tokyo].
★**Journal of Meteorology,** American Meteorological Society, [Boston].
★**Journal Scientifique de la Météorologie,** Société Météorologique de France, [Paris].
★**The Marine Observer,** Air Ministry, Meteorological Office, London.
★**The Meteorological Magazine,** Air Ministry, Meteorological Office, London.
★**Meteorologické Zprávy** [Prague].
★**Meteorological Society of Japan, Journal,** [Tokyo].
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★**Meteorologische Rundschau,** [Berlin].
★**Monthly Weather Review,** U. S. Weather Bureau, Washington, D. C.
Polarforschung, Archiv für Polarforschung, [Kiel].
★**Przegląd Meteorologiczny i Hydrologiczny,** [Warsaw].
Revista de Geofísica, Instituto Nacional de Geofisica, [Madrid].
★**Revista Meteorologica,** Junta Nacional de Meteorología, Montevideo.
★**Rivista di Meteorologia Aeronautica,** Servizio Meteorologico, [Rome].
★**Royal Meteorological Society, Quarterly Journal,** [London].
★**South Africa, Weather Bureau, Notos,** [Pretoria].
★**Tellus,** Svenska Geofysiska Föreningen, Stockholm.
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★**Weather,** Royal Meteorological Society, [London].
★**Weatherwise,** American Meteorological Society, [Boston].
★**Wetter und Leben,** Österreichische Gesellschaft für Meteorologie, [Vienna].
★**WMO Bulletin,** World Meteorological Organization, [Geneva].
★**Zeitschrift für Meteorologie,** Meteorologisches Observatorium, Potsdam.

★ Indicates those periodicals which are primarily meteorological.

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